The IRON AGE

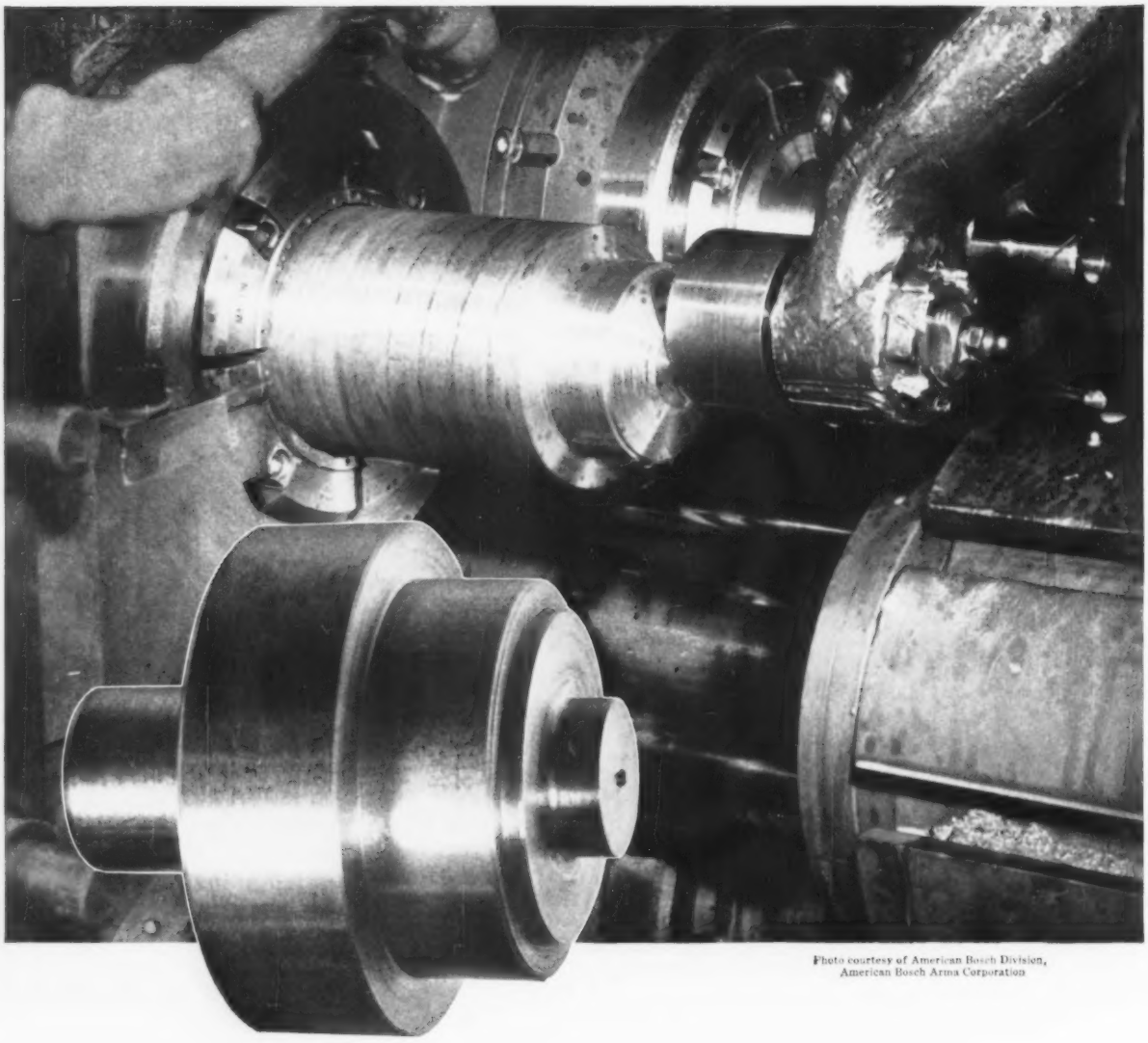
July 16, 1959 A Chilton Publication The National Metalworking Weekly

New Machine Forms Giant Tubes In One Pass P. 99

Metals Work New Dimension in Marketing – P. 63

How Warehouses View Steel Imports – P. 68

Digest of the Week – P. 2-3



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The IRON AGE

July 16, 1959—Vol. 184, No. 3

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Sell Designers—U. S. Steel is experimenting with a marketing approach, like aluminum's, along mar-

ket rather than product lines. It's beginning to look like this is the direction all metal marketing is headed. P. 63

STEEL LABOR TALKS

Why They Broke Down—Trouble over local working conditions in the mills was one of the main reasons why steel labor talks broke down. But there were other reasons as well. P. 67

SECURITY MUDDLE

It Lingers On—Supreme Court ruled that U. S. security program was illegal because it was not properly authorized. Congress ponders new laws to authorize the current system. P. 81

DEFENSE SUBCONTRACTORS

Valued Partners — Farwest aircraft and missile makers are ar-

Metalworking

FORMS GIANT TUBES: This unit developed by Lodge & Shipley literally flows hollow, relatively thick-walled, cylindrical blanks into long, thin-walled tubular sections. It's an answer to the need for a method to form such parts without welding. P. 99

dently wooing the subcontractors. The new weapons need the skills small shops can provide. P. 83

TOOL INSERTS

Don't Baby Them—Kennametal has been stumping for shops to push machines harder. In so doing, they get more work at only the cost of the cutting inserts. Response indicates it really works. P. 85

FEATURE ARTICLES

RUSSIAN MACHINE TOOLS

On Display—While Russian machine tools have some catching up to do to match U. S. makes, in some areas they're close. Tape controls are much less sophisticated than those in the U. S. Also Russian automation has a long way to go. Photo report gives cross-section view of the Reds' latest developments. P. 102

IMPROVE BLAST FURNACE

With Natural Gas—A recent two-week test using natural gas in a 16-ton blast furnace gave some interesting results. The findings, practically applied, could help stem the tide of coke's depletion from the ground. P. 104

DATA PROCESSING

Cuts Lead Time — Telescoping lead time to bring design improvements into production with little wasted motion is vital for military hardware. Here's how electronic data processing with punched cards and microfilm speeds engineering changes for one company in the missile industry. P. 106

LOW-COST EYELETS

Aid Metalworking—Eyelets can be fed automatically and set at very high rates. Tooling is inexpensive and eyeleting machines stand with today's lowest priced, high production equipment. P. 110

NEW MASTIC SEALER

For Curtain Walls — A curtain wall is no better than its joints. Here's a new sealer that solves many problems in design and erection of panel structures. P. 112

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WELDING EQUIPMENT

Flourishing Sales—Welding equipment makers estimate sales will be at least 20 pct above 1958 levels this year. Reason: New markets, new equipment, and techniques are all boosting sales. P. 66

FOREIGN STEEL THREAT

An IRON AGE Interview—Robert G. Welch, of American Steel Warehouse Assn., gives a first-hand report on what is behind foreign competition in U. S. and world markets. P. 68

AUTO HEADLAMPS

New Unit Adopted—Lamp makers may have gone about as far as they can go with conventional headlamps. New unit throws longer beam, stops short of glare danger. P. 77

STEEL MARKET

What Lies Ahead?—Steel mills are wondering how sharp the market letdown will be when labor peace comes. It depends, to a large extent, on the depth of steel inventories. P. 139

FASTENER PRICING

New Method By RB&W—Russell, Burdsall & Ward has introduced a new fastener pricing method using simplified discounts. First reactions are favorable. P. 140

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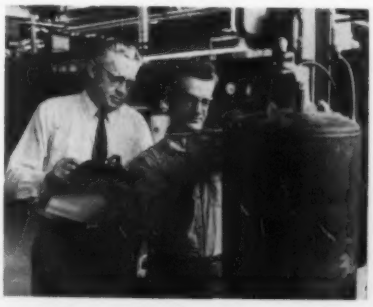
CUSTOMER SERVICE

Beyond the Plant—Some metalworking companies are extending quality control past the shipping dock. Next week's special report tells how these programs follow the product into the field to check on results and performance.



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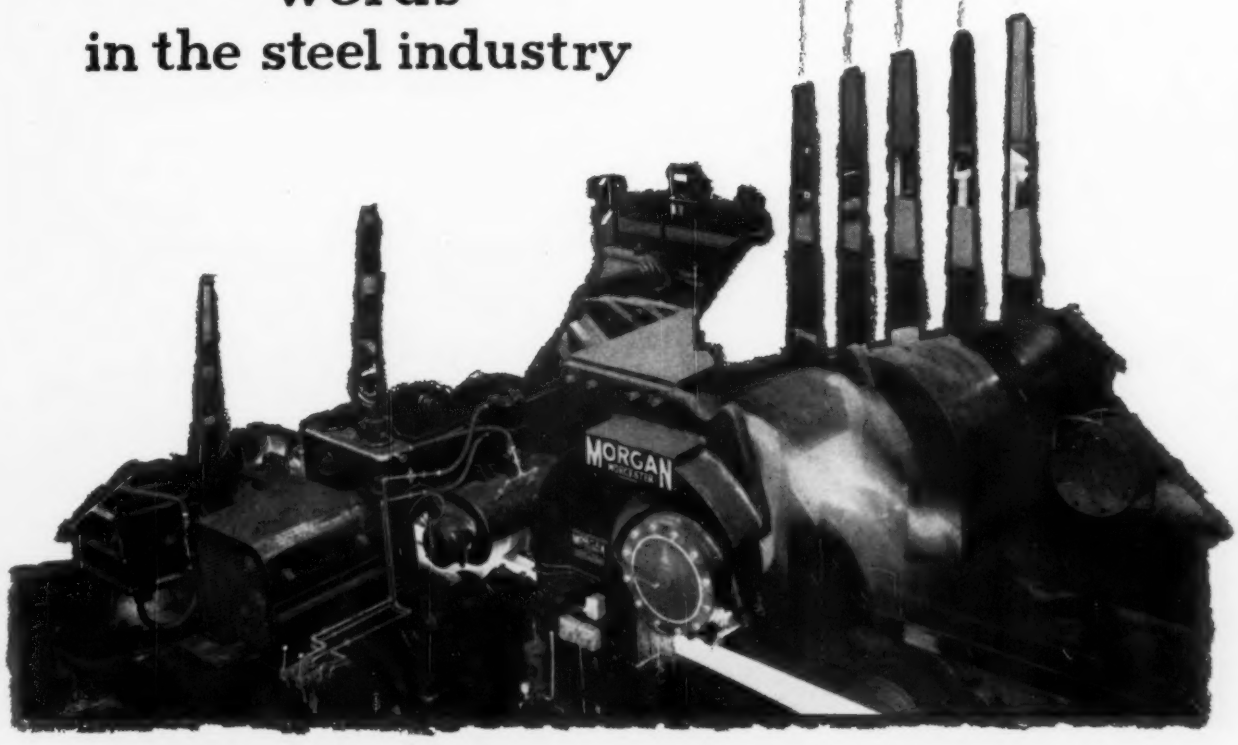

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Three-Way Bargaining Will We Be Stuck With It?

In the past many years we have seen government interfere in the steel labor hassles. At one time, some people thought this was due to the Democrats alone. Now they know this isn't so.

The theory is that, left alone, management and labor will work out their own problems. The practical side is almost akin to this theory. But for many years, neither theory nor practicality has been allowed much leeway.

True, there have been strikes in steel and in other basic industries. But in most of these cases, either the Administration or congressional pressure has been in the picture.

Many people of both parties believe that industry and labor are so big today that the "consumer" must be "protected." That is why the White House or the Senate is often forced into the picture. But this interference can be as much political as it is in the interests of the "people."

Take the steel labor scramble. It might have been solved in favor of the original steel industry stand this year if government had not intervened. The fact that the President feels he did not intervene does not mean he didn't.

This year is no exception to past years in the steel labor picture. The real crux is that once again in a Republican administration the government has been forced well into the labor picture.

The question then arises: Will we have this kind of last minute—or well planned—nudging and pushing by top government officials forever? To say that we won't might be too naive. To say that we shouldn't have it is being too logical.

But in the past 1000 years or so, when has a human race—or government—acted logically? When has a labor leader failed to try by any means possible to get more green stuff for his men?

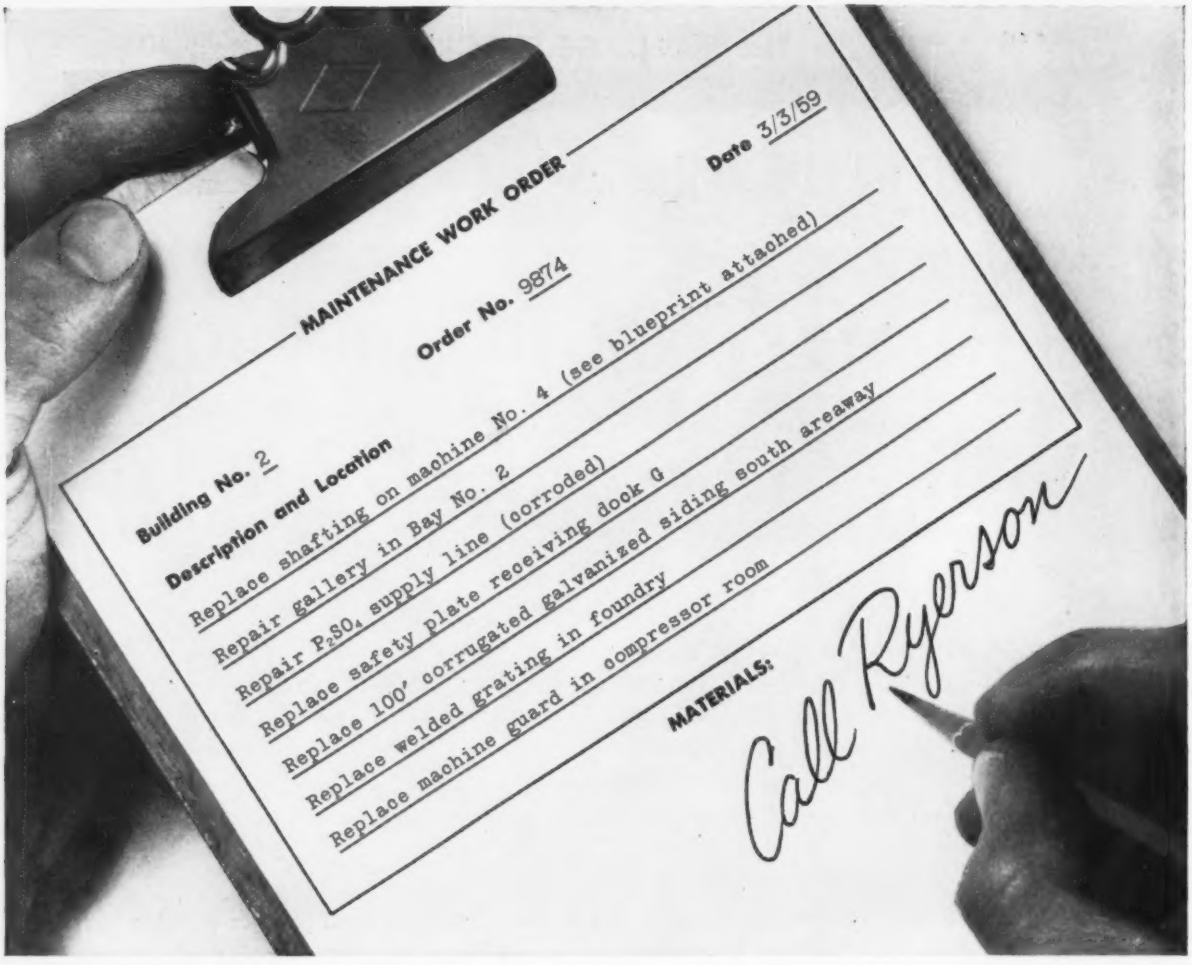
And when has a good business manager ever tried to do anything except make more profit, cut costs, and beat the brains out of his competitors?

With a growing monopoly in labor, which is somewhat similar to the industrial power at the turn of the century, it is logical for unions to court specific senators and congressmen. This same trend also applies to potential presidential candidates.

It may well be that we are stuck with government interference in collective bargaining. There may be little we can do about it except to hope it will be intelligent.

Tom Campbell

Editor-in-Chief


MAINTENANCE WORK ORDER
Date 3/3/59
Order No. 9874
Building No. 2
Description and Location
Replace shafting on machine No. 4 (see blueprint attached)
Repair gallery in Bay No. 2
Repair P_2S_0 supply line (corroded)
Replace safety plate receiving dock G
Replace 100' corrugated galvanized siding south areaway
Replace welded grating in foundry
Replace machine guard in compressor room
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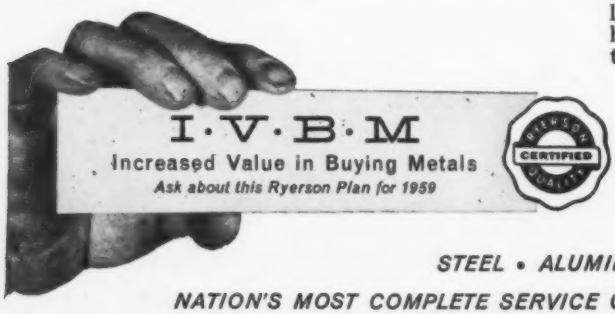

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Toughens Corrosion Test

A major automaker is reported ready to adopt a new corrosion test for trim materials. The company began using an accelerated salt spray test early this year. Two weeks ago it called in stainless men and advised that a drop or spot test would probably be adopted. New test uses a strong etching solution and is said to be even tougher than the old one.

New Class of Metallics

Termed lead-cemented alloys, a new class of metallic materials shows promise. They are made by mixing molten lead with finely divided solid particles of other metals or materials. The result combines the properties of both lead and the second substance. A lead-boron combination, for example, would make an excellent nuclear shielding material.

Ductile Iron for Engines

As a method of realizing weight reduction in truck engines, manufacturers are turning to ductile iron for use in blocks, heads and pistons. It has resulted in the trimming of 60 lb from the weight of a present V8 engine. Average wall thickness of the block dropped from 0.200 to 0.125 in. There's less weight per horsepower at no sacrifice in engineering properties.

Galvanized Sheet Capacity

Currently scheduled projects will boost galvanized sheet capacity by at least 15 pct over the next 3 to 5 years, mainly in continuous hot dip lines. If expected automotive applications come through, capacity plans will probably be quickly upped.

To Learn More About Ocean

Oceanic research speedup to bolster U. S. industry and defense is urged in the Senate. Senate Commerce Committee approves a resolution calling for expanded studies and better charting of the ocean depths. Studies may be needed merely to tell the U. S. what Russia already knows about waters near American shores. Warnings are out that the Russians have charted Pacific waters close to U. S. coast.

Aluminum for Freight Cars

It's a big year for aluminum in railroad markets. The news of a large sale of metal for freight cars will soon be topped by an announcement that an all-welded aluminum hopper car is approved for exchange among the railroads of North America. Aluminum insiders say this is a breakthrough since it's the first official recognition of aluminum freight rail carriers as standard equipment.

Atomic Plant to Spur Data

A second atomic electric plant is planned for Michigan. Scheduled for operation some time in 1962, the reactor will be a direct cycle, boiling water unit of 50,000-kw capacity. Primary objective of the project is development of engineering and economic data on high power density and high specific power.

Steel Building Materials

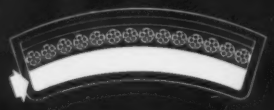
Producers of steel building materials are still confident that cutbacks in public building programs will not affect their business this year. This would suggest a record total use for structural and concrete reinforcement applications. Only hitch is the growing percentage of this steel business that will be captured by importers of foreign steel.

How to Cope with Risks?

At least 2000 potential saboteurs threaten U. S. defense plants, Congress is warned. But the tangled status of industrial security prevents removal of these dangerous employees. Defense Dept. contracts do not bar employment of Communists in a defense plant if they do not have access to classified material. Bill to provide safeguards against the risky workers remains untouched after nearly six months.

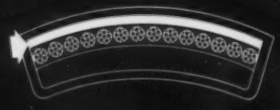
Want to control the Variables on your Variable-speed drives?

Control Slippage with Goodyear Variable-Speed Belts that have a specially compounded, abrasion-resistant cover to take a strong, uniform grip on both sides of the sheave.



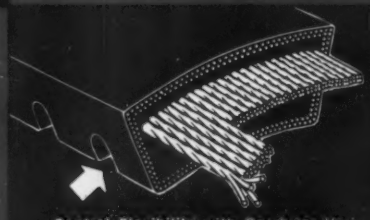
Control "Dishing" with Goodyear Variable-Speed Belts that incorporate a special, fiber-reinforced, synthetic-rubber compression section to resist side pressures – protect from fatigue.

Control Shrinkage-Stretching with Goodyear Variable-Speed Belts that are sinewed by exclusive Triple Tempered (3-T) Cord for true dimensional stability in storage and in use.



Control Uneven Pull with Goodyear Variable-Speed Belts that feature a special, "cool-running" tension section to assure balance of yield – equalizing pull on either side of the belt.

Control Chafing Action with Goodyear Variable-Speed Belts that have a special "floating gum" insulating section to transfer all the load to the load-carrying cords.



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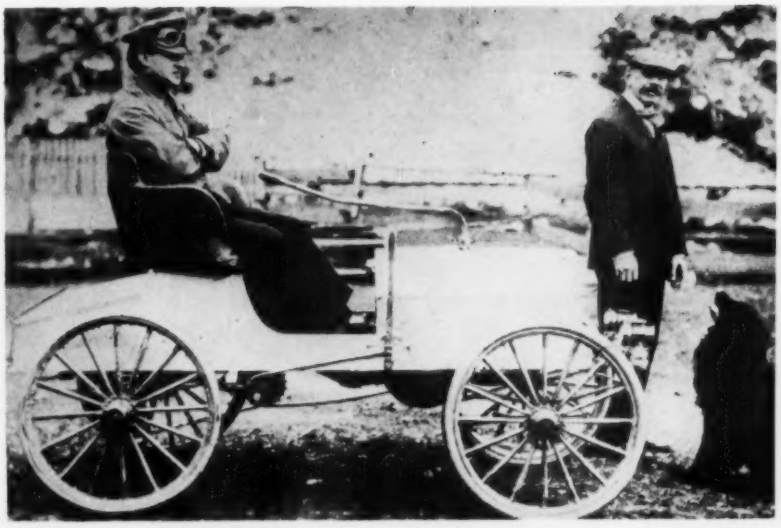


EASY TO REVERSE: First Alaskan-built automobile made by Robert E. Sheldon in 1905 eliminated one transmission problem. Since engine (salvaged from a sunken boat) would run in either direction he just reversed it in order to back up.

Saga from the 49th

Out of the north—down from our 49th state, Alaska—comes an inspiring saga of the American pioneering spirit at its best. It's a gripping tale of how romance and invention brought about the first Alaskan-built automobile. And, we warn you, it's a thriller.

Back in 1905 Robert E. Sheldon, now a member of Alaska's first state legislature, wanted to impress a young lady being courted by another suitor.

The Rivals — Sheldon's rival owned a fancy horse-drawn carriage. So Sheldon decided to build a gasoline engine automobile based on pictures he'd seen in newspapers and magazines.

He salvaged a 3½-hp Detroit-made engine from a sunken boat and powered the rear wheels of his "automobile" with two bicycle chains and sprockets.

Always a Pioneer—Sheldon's interest in horseless carriages didn't stop with this venture. Eight years later he blazed a trail over a wagon path to Valdez (370 miles) in a new mass-produced American car. (This road later became Alaska Route 1—a main part of the state's 2000-mile primary road system.)

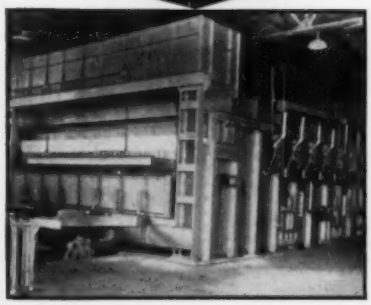
Auto's Fate—What happened to Mr. Sheldon's pioneer automobile? He donated it to the University of Alaska Museum where it remains in running condition.

There is only one question we cannot answer: Who got the girl?

New Puzzler

When I was a farmer lad and we sat down to the evening milking my father would pose a question like this: If a fish had a head 4 in. long and a body as long as his head and tail put together and a tail as long as his head and one-half his body, how long was the fish? It was surprising how choreless the evening chores were!

FIRST CHOICE FOR PIPE ANNEALING



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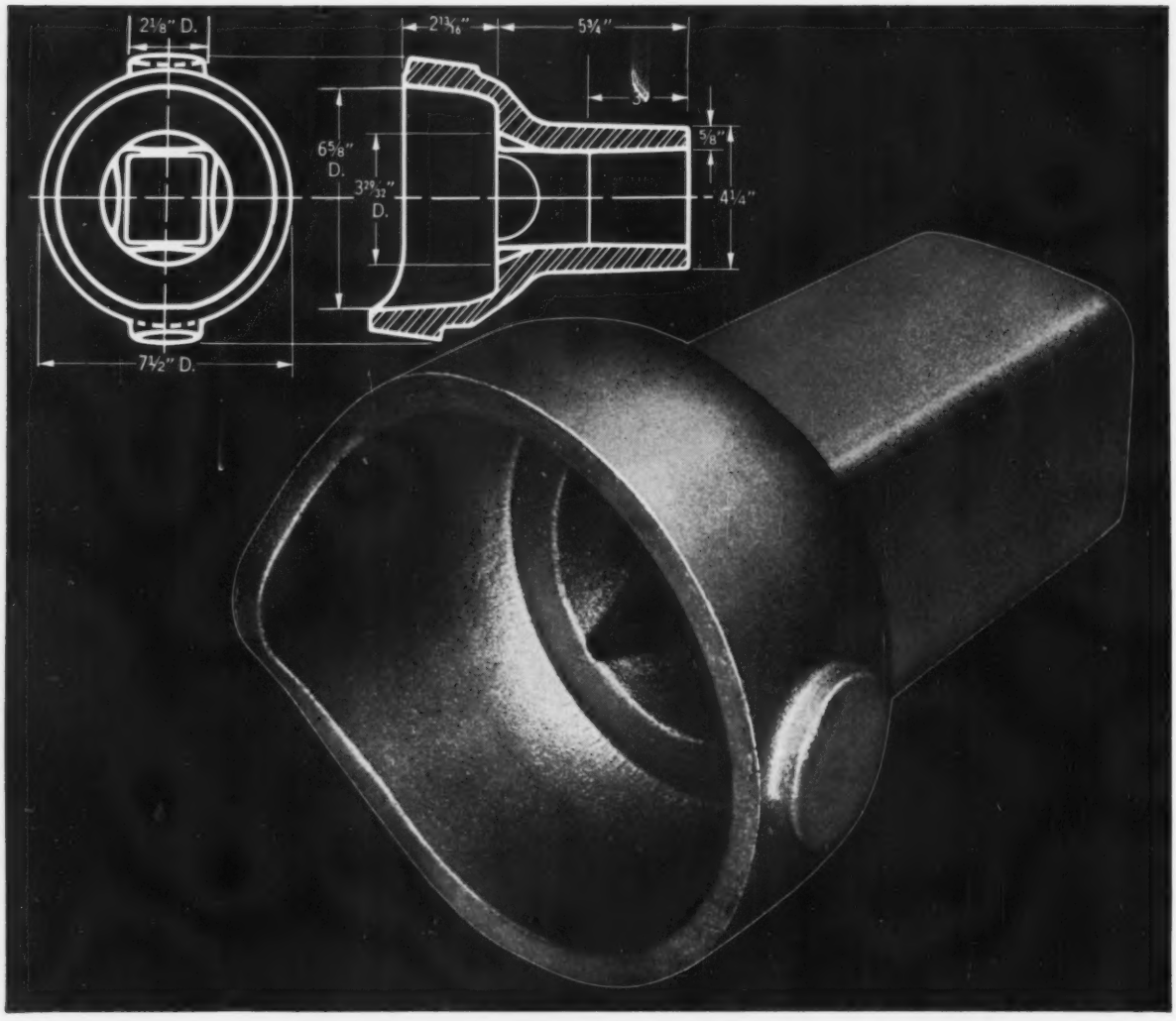
R-S experience goes back to the first centrifugal cast iron pipe produced in this country more than 35 years ago. Since then cast iron pipe annealing furnaces have been a specialty with R-S engineers. Their experience and development of furnaces to meet the needs of annealing cast iron pipe has kept pace with the industry. Today, R-S pipe annealing furnaces offer greater uniformity of heating through all ranges and precision controlled cooling.

R-S pipe annealing furnaces range in capacities from 15 to 35 tons per hour. Write for complete information on the newest developments in centrifugal cast iron pipe annealing by R-S.

R-S FURNACE COMPANY, INC.
NORTH WALES, PA.

R-S FURNACES



Odd Shape...Natural for Casting?

Look how "Task-Forging" improved strength, reduced cost!

Once cast in steel, this front axle trunnion socket is now forged by COMMERCIAL on an 8" upsetter from 3¾" diameter SAE 1040 bar stock. Result: Costly excess machining and waste stock is eliminated by internal and external displacement of metal to only the points where it is needed for greatest efficiency.

Notice the open rectangular end, the angularity at the open belled end, the increased metal thickness at the bosses, and their eccentric center line position. Such an odd shape is seldom considered as an upset forging, yet to the COMMERCIAL "Task-Forging" team, with years-ahead pioneering in specialized techniques and equipment, upsetting the large stock displacement to + 0, −1/16" internally and + 1/16", − 0 externally was routine.

The improved strength and efficiency of this part is a direct contribution of COMMERCIAL "Task-Forging"... a complete service offering research, testing and design assistance to manufacturers seeking stronger, more compact component parts at less cost. Backed by modern, highly advanced upsetting facilities, the COMMERCIAL "Task-Forging" team is producing unusually complicated shapes with flexibility closely approaching the casting process while retaining the inherent strength and material integrity of forgings.

Please feel free to avail yourself of COMMERCIAL's "Task-Forging" service, without obligation. Just send a blueprint or sketch of your unusual or difficult part... existing or planned. With 30 years of specialization in "tough" metal forming problems, and equipment "designed-by-experience" to handle them, COMMERCIAL engineers may well be able to help you. Write to Commercial Shearing & Stamping Company, Dept K-29, Youngstown 1, Ohio.

COMMERCIAL
shearing & stamping

LETTERS FROM READERS

Technical Progress

Sir—Would it be possible to mail me twelve reprints of the following article—"Why Technical Progress Is Vital for Growth and Prosperity" (June 25 issue).

We are contemplating making an extensive investment in new equipment for our foundry and I would like to give each director a copy of this article at the time I submit my request for funds for this equipment. —W. A. Faison, President, The Atlantic Steel Castings Co., Chester, Penna.

Sir—Please send me a reprint of the article "Why Technical Progress Is Vital for Growth and Prosperity." —E. D. Sayre, Mgr., Chemical Eng., Applied Research Operation, General Electric Co., Cincinnati.

Sir—Please send me a copy of this special report.—F. Rondepierre, Production Management Engr. Renault, Inc., New York City.

▪ **In all cases reprints are on the way.—Ed.**

Call for Help

Sir—We are interested in machines for polishing small tubes, from ½ in. diam. to a maximum of 1¼ in.

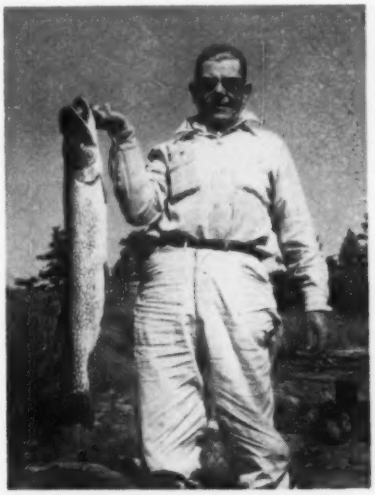
These machines have three polishing heads in line and are about 4 ft overall in length. The writer saw them in operation in Italy.

Perhaps you could give us the name of American manufacturers who would be able to help us.—Walter Lines, chairman, Lines Bros. Ltd., Tri-Ang Works, Morden Road, Merton, London, S. W. 19, England.

▪ **Perhaps our readers can help —Ed.**

Fish Story

Sir—One question regarding your Salute to Russ Harris (Finding New Markets for Steel) in the June 25 issue. The most important item was omitted. How much did the



fish in the photo weigh?—Burt W. Dreyer, Costa Mesa, Calif.

▪ **Ease your mind, Reader Dreyer. The fish—caught by Mr. Harris in Canada — was a Great Northern pike, weighing 14 lb.—Ed.**

Likes Handbook

Sir—I believe The Iron Age Metal Cleaning & Finishing Handbook in your June 4 issue will be very helpful to sales engineers and others in our company. Although I realize some of the tables were furnished through the courtesy of other companies, I wonder if reprints are available of the complete handbook.

If so, I would like to obtain thirty copies.—R. J. Foster, Sales Mgr., Conveyor Div., Columbus McKinnon Chain Corp., Tonawanda, N. Y.

▪ **Reprints are certainly available. The Handbook is being reprinted right now and you will get your copies soon.—Ed.**

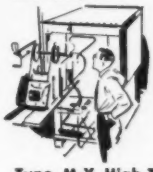
ED JOHNSON
Furnace Application Engineer, reports . . .

SINTERING GOES SCIENTIFIC

The effective bonding of powder metal compacts is dependent on precise sintering temperatures, and the properly reactive furnace atmosphere for each temperature range. To assure optimum results at lowest cost, Hayes offers both the *right* furnace and the *right* atmosphere for any sintering operation, whether you're working with ferrous, nonferrous, or refractory metals; stainless steel compacts; or cermets. Hayes furnaces and atmospheres suitable for research, high-temperature, or production sintering, include:

Type BA-M Pusher "Pilot Plant" Furnace. Controlled atmosphere heating and cooling . . . straight-through design. Manual or automatic operation to 2150° F.

Conveyor Furnaces straight-through LAC and Humpback BAC — for continuous, automatic, sintering to 2100°F. Zone temp control. Burn-off sections. For stainless steel, etc.



Type BA High-Speed Pusher Furnace — wide-temperature-range furnace for sintering to 2350° F. Available with automatic, electro-hydraulic pusher system for constant time / temperature cycles.

Type M-Y High-Temperature Furnace for uniform heating of ceramic and metal compacts at temps over 3000° F. Economical — use with reducing atmospheres for close-control research or full-scale production.

Model HT/HV Vacuum Furnace for high vacuum (0.1 micron), high temperature (3000° F plus) sintering special refractory metals—titanium, zirconium, tungsten, etc. High-speed heating and cooling cycles. Cold wall design, low voltage elements.

Atmosphere Equipment . . . ammonia dissociators; endothermic, exothermic, nitrogen, forming gas generators; Molecu-Dryers for drying protective atmospheres to —100° F D.P. Designed for controlled, dependable operation.

Use Hayes experience and equipment to insure a "Results Guaranteed" solution to *your* heat treating or protective atmosphere problem—to improve your product, reduce spoilage, or speed up production. Write for details.

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It pays to see **HAYES** for metallurgical guidance, lab. facilities, furnaces, atmos. generators, gas and fluid dryers.

QUOTES

from users of...

...New 100% Chemi-Cool HOCUT

cools...
lubricates...
prevents rust...
stays mint-fresh for life!

Pick the Performance you want...

Then try HOCUT 237

"... Marked reduction in Coolant expense ..."

"... Eliminated a cleaning operation ..."

"... Further savings are experienced because of not having to drain and refill systems periodically ..."

"... Rust protection is far superior than that of soluble oil ..."

"... 100% improvement noted on machining operations ..."

"... Ample lubricity for heavy cuts ..."

"... Work is cold as it comes from the machine ..."

"... Finish and tool life better than with straight sulphurized oil ..."

"... Rancidity and objectionable odors have been eliminated ..."

"... Rust preventive characteristics are excellent. Parts in process are protected overnight and during weekend shut-down ..."

"... Capacity was 28 pieces per day and has been increased to 80 pieces per day ..."

"... Able to increase speeds and feeds to realize the full potential of the lathe"

"... Tool life increased to 2½ times the service formerly obtained ..."

"... Present life of form, box and cut-off tools is four times previous record ..."

Call your Houghton Man or write E. F. Houghton & Co., 303 W. Lehigh Ave., Phila. 33, Pa.

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a product of...

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Ready to give you on-the-job service

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Detroit, Mich. • San Francisco, Calif. • Toronto, Canada

COMING EXHIBITS

Instrumentation Show — Sept. 21-25, International Amphitheatre, Chicago. (Instrument Society of America, 313 Sixth Ave., Pittsburgh 22.)

Metal Show — Nov. 2-6, International Amphitheatre, Chicago. (American Society for Metals, 7301 Euclid Ave., Cleveland 3.)

MEETINGS

JULY

Metal Lath Mfrs. Assn.—Meeting, July 21-22, Statler Hotel, Buffalo, N. Y. Association headquarters, Engineers Bldg., Cleveland.

Assn. of Roller & Silent Chain Mfrs.—Summer meeting, July 22-23, Grand Hotel, Mackinac Island, Mich. Association headquarters, 3343 Central Ave., Indianapolis.

SEPTEMBER

Pressed Metal Institute — Annual meeting, Sept. 13-17, Estes Park, Colorado. Institute headquarters, 3673 Lee Rd., Cleveland.

American Mining Congress—Metal mining-industrial minerals convention, Sept. 14-17, Denver, Colorado. Congress headquarters, 1200 18th St., N. W., Washington, D. C.

American Die Casting Institute—Annual meeting, Sept. 15-18, Edgewater Beach Hotel, Chicago. Institute headquarters, 366 Madison Ave., New York.

National Petroleum Assn.—Annual meeting, Sept. 16-18, Traymore Hotel, Atlantic City, N. J. Association headquarters, Munsey Bldg., Rm. 958, Washington 4, D. C.

Steel Founders' Society of America—Fall meeting, Sept. 21-22, The Homestead, Hot Springs, Va. Society headquarters, 606 Terminal Tower, Cleveland.

Electronic Industries Assn.—Quarterly meeting, Sept. 22-24, Plaza Hotel, New York. Association

(Continued on P. 16)

New Kidde carbon dioxide portables awarded highest U.L. rating!

Belleville, N. J. June 1—A spokesman for Walter Kidde & Company announced here today that six of the company's new portable fire extinguishers have been awarded the Underwriters' Laboratories highest ratings for their respective capacities. To those interested in fire safety, this means that, pound for pound, these new Kidde units have more fire-killing power than any other carbon dioxide extinguishers on the market today.

Available in 10, 15 and 20 pound capacities, in either squeeze valve or trigger models, these power-packed Kidde units feature new hose and discharge horn assemblies, which are responsible for their extra fire fighting ability. This hose-horn combination is also being offered as a replacement unit for existing 10, 15 and 20 pound carbon dioxide units, and when attached will upgrade their effectiveness equal to the new ratings.

For more information on these top-rated Kidde carbon dioxide portables write Kidde today.

Kidde

Walter Kidde & Company, Inc.
749 Main St., Belleville 9, N. J.
Walter Kidde & Company of Canada Ltd.
Montreal—Toronto—Vancouver

Add a Quality String to Your Bow...

WALLINGFORD

Stainless Strip and Tubing

If you are aiming at new design or performance targets for your stainless steel products – or parts – Wallingford can add an important quality string to your bow.

Every pound or inch of Wallingford Stainless Steel Strip and Tubing is of consistent, unmatched quality, because *Wallingford produces tonnage on a laboratory basis.* Exacting standards – unsurpassed in the industry – are maintained by utilizing the most advanced production control methods and facilities yet developed. Tensile tests, X-ray diffraction studies, automation gaging, laboratory samplings, and many other tests and techniques assure *super-quality.*

Are you presently getting this "quality insurance" when you purchase stainless steel? If not, contact The Wallingford Steel Co., Wallingford, Conn., for further data and a copy of our latest data book.

THE WALLINGFORD STEEL CO.

Progress in Metals for over 37 Years

WALLINGFORD, CONN., U.S.A.

COLD ROLLED STRIP: Super Metals, Stainless, Alloy

WELDED TUBES AND PIPE: Super Metals, Stainless, Alloy

EXHIBITS, MEETINGS

(Continued from P. 15)

headquarters, 1721 DeSales St., N. W., Washington 6, D. C.

Porcelain Enamel Institute, Inc.—Annual meeting, Sept. 24-26, The Greenbrier, White Sulphur Springs, W. Va. Institute headquarters, 1145 19th St., N. W., Washington 4, D. C.

Association of Iron & Steel Engineers—Convention, Sept. 28-Oct. 1, Sherman Hotel, Chicago. Association headquarters, 1010 Empire Bldg., Pittsburgh.

American Welding Society — National fall meeting, Sept. 28-Oct. 1, Hotel Sheraton-Cadillac, Detroit. Society headquarters, 33 W. 39th St., New York.

OCTOBER

National Assn. of Sheet Metal Distributors — Annual meeting, Oct. 4-7, Atlantic City, N. J. Association headquarters, 1900 Arch St., Philadelphia 3.

Truck Body & Equipment Assn., Inc.—Annual convention and exhibit, Oct. 5-7, Sherman Hotel, Chicago. Association headquarters, 1616 "K" St., N. W., Washington 6, D. C.

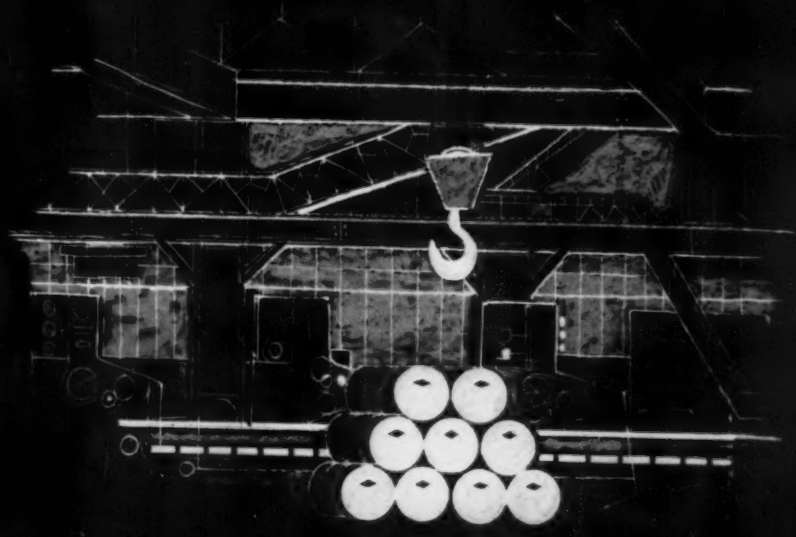
American Gas Assn.—Annual convention, Oct. 5-7, Chicago. Association headquarters, 420 Lexington Ave., New York.

Society of Automotive Engineers—National aeronautic meeting, aircraft manufacturing forum and engineering display, Oct. 5-10, Ambassador Hotel, Los Angeles. Society headquarters, 485 Lexington Ave., New York 17, N. Y.

Gray Iron Founders' Society, Inc.—Annual meeting, Oct. 7-9, Fairmont Hotel, San Francisco, Calif. Society headquarters, 930 National City-E 6th Bldg., Cleveland.

Conveyor Equipment Manufacturers Assn.—Annual meeting, Oct. 10-13, Grand Hotel, Point Clear, Ala. Association headquarters, One Thomas Circle, Washington, D. C.

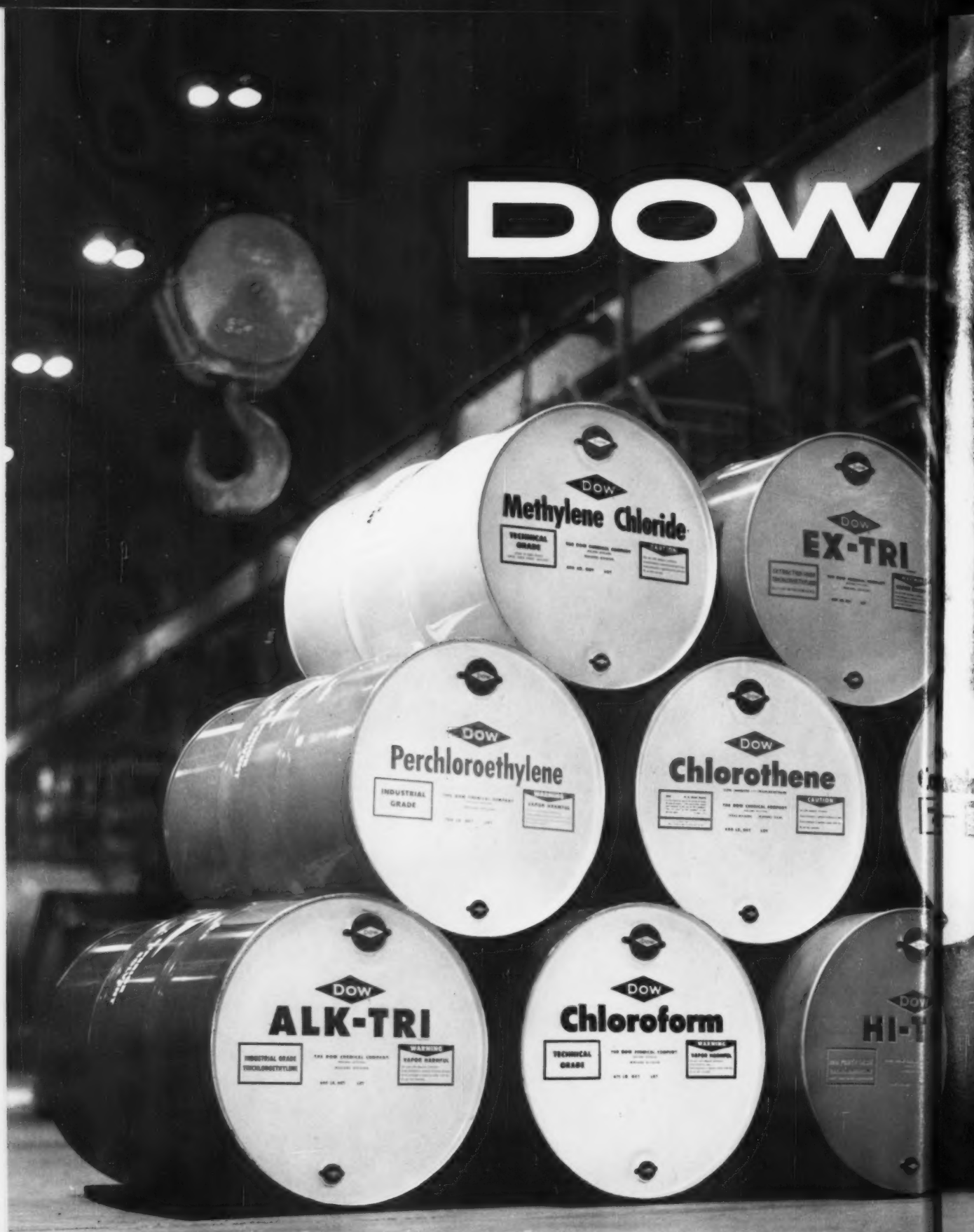
DOW | METAL CLEANING SOLVENTS



7 IMPORTANT REASONS WHY YOU SHOULD BUY SOLVENTS FROM A DOW DISTRIBUTOR

1. Distributors of Dow Solvents are local businessmen in your own community. They know the local customs, people, economic conditions.
2. They have large stocks of solvents near you. This guarantees fast delivery.
3. Technical service is located in your community or near you. Again fast service.
4. Distributors of Dow Solvents offer personalized service. If you need a product on a rush basis—or technical help—you will get it.
5. Dow stands behind each and every one of its distributors. They are chosen to be distributors of Dow Solvents, because of their ability to serve you best.
6. Because Dow makes the widest line of chlorinated solvents in the business, distributors of Dow Solvents can offer you the widest line to select from.

And, now, to learn of the seventh and equally important reason, turn the page . . .



New color code eliminates confusion when two or more different solvents are used in one plant.

announces 9 new color coded drums with side and top labels

Dow's 9 chlorinated solvents—Chlorothene*, perchloroethylene, NEU-TRI*, EX-TRI*, ALK-TRI*, HI-TRI*, methylene chloride, carbon tetrachloride, chloroform—now have their own color coded 55 gallon drums. Equally important is the fact that all drums are now identified both on top and side! In fact, you can easily identify a drum at a distance of 100 feet. THE DOW CHEMICAL COMPANY, Midland, Michigan, Chemicals Merchandising Department 709

DOW CHLORINATED SOLVENTS COLOR CODE

Chloroform—black and white
Methylene Chloride—yellow and black
Perchloroethylene—orange and white
Chlorothene—green and white
Carbon Tetrachloride—black and yellow
ALK-TRI — cream and blue
EX-TRI—blue and light blue
NEU-TRI — blue and white
HI-TRI — blue and orange

*Trademark

Drums stacked on top of each other are now easily identified.

All Dow industrial solvent drums are clearly labeled top and side

For the name of your nearest distributor of DOW solvents, turn the page

DOW

FOR HELPFUL METAL CLEANING INFORMATION

get in touch with your Dow Solvents Distributor

DOW

LETTER KEYS: (C)—Chlorothene®; (M)—Methylene Chloride; (P)—Perchloroethylene (Industrial); (T)—Trichloroethylene

ALABAMA

BIRMINGHAM—Wittichen Chemical Company (C M P)
BIRMINGHAM—F. H. Ross and Company (C M P T)
MOBILE—Barada and Page, Inc. (C M)
MOBILE—McKesson & Robbins, Inc. (C M P T)
MOBILE—F. H. Ross and Company (C M P)
MONTGOMERY—Wittichen Chemical Company (C M P)

ARIZONA

PHOENIX—Braun Chemical Company (C M P T)
PHOENIX—Western Chemical Company (C M P)
TUCSON—Western Chemical Company (C M P)

CALIFORNIA

LOS ANGELES—Braun Chemical Company (C M P T)
LOS ANGELES—McKesson, Mefford Chemical Division (P)
LOS ANGELES—Pemaco, Inc. (P T)
OAKLAND—B. N. Meacham Company (C)
SAN DIEGO—Braun Chemical Company (C M P T)
SAN DIEGO—Buel Town Company (T)
SAN FRANCISCO—Braun-Knecht-Heimann Co. (C M P T)
SAN FRANCISCO—G. N Meacham Company (C)
SOUTH GATE—American Mineral Spirits (P)

COLORADO

DENVER—Braun-Knecht-Heimann Company (C M)
DENVER—Chemical Sales Company (C M P T)
DENVER—McKesson & Robbins, Inc. (C M P T)
DENVER—Mine and Smelter Supply Company (C M P T)
GRAND JUNCTION—C. D. Smith Co., Chemical Div. (C P T)

CONNECTICUT

NEW HAVEN—H. Krevit and Company, Inc. (P T)
SHELTON—Axton-Cross Company (C M P T)
SOUTH NORWALK—McKesson and Robbins, Inc. (C M P T)
SOUTH NORWALK—Guard-All Chemical Company (P T)

FLORIDA

JACKSONVILLE—F. H. Ross and Company (C M P T)
JACKSONVILLE—Amica Burnett Chemical Co. (C M P T)
MIAMI—Amica Burnett Chemical Company (C M P T)
MIAMI—Biscayne Chemical Laboratories (C M P T)
ORLANDO—Atlantic Chemicals, Inc. (C M P T)
TAMPA—Atlantic Chemicals, Inc. (C M P T)

GEORGIA

ATLANTA—Chapman Chemical Company (T)
ATLANTA—McKesson and Robbins, Inc. (C M P T)
ATLANTA—F. H. Ross and Company (C M P T)
ATLANTA—Southern States Chemical Company (C M P T)
BIRMINGHAM—Chapman Chemical Company (T)
COLUMBUS—F. H. Ross and Company (C M T)
DUBLIN—Textile Aniline Chemical Company (T)

IDAHO

BOISE—Van Waters and Rogers, Inc. (C M P)

ILLINOIS

AURORA—River Valley Chemicals Inc. (C M P T)
CHICAGO—Central Solvents and Chemicals (C M P)
CHICAGO—C. P. Hall Company (C M P T)
CHICAGO—Keystone Aniline and Chemical Co. (C P)
CHICAGO—McKesson & Robbins, Inc. (C M P T)
CHICAGO—Joseph Turner and Company (C M P T)
DECATUR—McKesson & Robbins, Inc. (C M P T)
EFFINGHAM—Wabash Independent Oil Company (C P T)
PEORIA—McKesson & Robbins, Inc. (C M P T)
ROCKFORD—Industrial Oil and Chemical Company (C)
ROCKFORD—Viking Chemical Company (C M P T)

INDIANA

EVANSVILLE—Charles Leich and Company (P)
FT. WAYNE—Hoosier Solvents and Chemicals (C M P)
FT. WAYNE—Inland Chemical Corporation (C M P)
HAMMOND—Inland Chemical Corporation (C M P T)
INDIANAPOLIS—Hoosier Solvents and Chemicals (C M P)
INDIANAPOLIS—Wm. Lynn Chemical Company (C M P)
INDIANAPOLIS—Lynn Solvents Corporation (T)
INDIANAPOLIS—Ulrich Chemical Company, Inc. (T)
KOKOMO—Plating Products, Inc. (P T)
LOGANSPORT—Plating Products, Inc. (P T)
SOUTH BEND—Inland Chemical Corporation (C M P T)
SOUTH BEND—Stevens Oil Company (C M P)

IOWA

BETTENDORF—Barton Naptha Corporation (C M P T)
BURLINGTON—McKesson and Robbins, Inc. (C M P T)
CEDAR RAPIDS—McKesson and Robbins, Inc. (C M P T)
COUNCIL BLUFFS—Barton Solvents, Inc. (C M P T)
DAVENPORT—McKesson & Robbins, Inc. (C M T)
DES MOINES—Barton Naptha Company (C M P T)
SIOUX CITY—McKesson and Robbins, Inc. (P)
SUMNER—Overton Chemical Sales (C)

KANSAS

WICHITA—Barada and Page, Inc. (C M)
WICHITA—Reid Supply Company (C P T)

KENTUCKY

LOUISVILLE—Dixie Solvents and Chemicals (C M P)
LOUISVILLE—Gans Chemical and Supply Company (P)
LOUISVILLE—McKesson and Robbins, Inc. (C M P T)

LOUISIANA

BATON ROUGE—Barada & Page, Inc. (C)
LAKE CHARLES—Barada and Page, Inc. (C M)
NEW ORLEANS—Barada & Page, Inc. (C)
NEW ORLEANS—Southern Solvents and Chemicals (C M P T)

MAINE

LEWISTON—Polar Chemical Company (C M P T)

MARYLAND

BALTIMORE—B. J. Howard Company (C M P T)
BALTIMORE—Leidy Chemicals Corporation (C M P)
BALTIMORE—Seiler Chemicals (C)
BALTIMORE—Tilley Chemical Company (T)

MASSACHUSETTS

BOSTON—Howe and French, Inc. (C M)
BOSTON—Linder and Company, Inc. (C M P T)
BOSTON—McKesson and Robbins, Inc. (C M P T)
EVERETT—Sessions-Gifford Co., Inc. (C M P T)
FRAMINGHAM—Axton-Cross Corp. of Mass. (C P T)
HINGHAM—Stephen-Roger, Incorporated (C M P T)
HOLYOKE—Eastern Chemicals, Inc. (M)
SPRINGFIELD—Chemical Corporation (C M P T)
SPRINGFIELD—Hampden Color and Chemical Co. (C M P)
STONEHAM—George Mann & Co. (C M P T)
WORCESTER—George H. Clark and Co. (C M P T)

MICHIGAN

DETROIT—Eaton Chemical and Dyestuff (C M)
DETROIT—Manpro Corporation (C M P T)
DETROIT—McKesson and Robbins, Inc. (C M P T)
DETROIT—Western Solvents and Chemicals (C M P)
DETROIT—Whitfield Chemical Company (P)
EAST DETROIT—Sherwood Chemical Company (P)
ESCANABA—Haviland Products Company (C M P)
FERNDALE—Manpro Corporation (C M P T)
GRAND RAPIDS—P. B. Gast and Sons Company (C)
GRAND RAPIDS—Haviland Products Company (C M)
GRAND RAPIDS—Wolverine Solvents and Chemicals Co. (C M P)
LANSING—Carrier Stephens Company (C P)
LANSING—Wheaton Chemical Company (C P T)
LUDINGTON—P. B. Gast and Sons Company (C)

MINNESOTA

MINNEAPOLIS—W. H. Barber Company (P T)
MINNEAPOLIS—McKesson and Robbins, Inc. (C M P T)
MINNEAPOLIS—Tripoli Refining Corporation (M P T)
ST. PAUL—Lyons Chemicals, Inc. (C M P)

MISSISSIPPI

JACKSON—F. H. Ross and Company (C M P)

MISSOURI

KANSAS CITY—Barada and Page, Inc. (C M)
KANSAS CITY—Missouri Solvents and Chemicals (C M P)
KANSAS CITY—Sherwood and Company, Inc. (C M P T)
ST. LOUIS—Barada and Page, Inc. (C M)
ST. LOUIS—Independent Oil Company (C M P T)
ST. LOUIS—McKesson and Robbins, Inc. (C M P T)
ST. LOUIS—G. S. Robins and Company (C M P)
ST. LOUIS—St. Louis Solvents and Chemicals (C P T)
ST. LOUIS—Missouri Solvents and Chemicals (C M P)

NEBRASKA

OMAHA—Barton Solvents, Inc. (C M P T)
OMAHA—McKesson and Robbins, Inc. (C M P T)

NEW JERSEY

BLOOMFIELD—McKesson & Robbins, Inc. (C M P T)
CAMDEN—Callahan Chemical Company (M P T)
EAST PATERSON—Aetna Color and Chemical Company (C M P T)
MURRAY HILL—American Mineral Spirits (C M P T)
NEWARK—American Oil and Supply (C P)
NEWARK—National Oil and Supply Company (C M P T)
PALISADE PARK—Philip A. Hunt Company (C)
VINELAND—Lirio Chemical Company (C T)

NEW MEXICO

ALBUQUERQUE—Braun Chemical Company (C M P T)
ALBUQUERQUE—Edmunds Chemical Company (C M P T)

NEW YORK

ALBANY—Eastern Chemical (C M P)
ATHENS—Spick Products Company (P T)
BINGHAMTON—Collier Chem. (C M)
BRONX—Elco Solvents Corporation (M P T)
BROOKLYN—Enequist Chemical Company (C P)
BUFFALO—Buffalo Solvents and Chemicals (C M P)
BUFFALO—Chemical Sales Corporation (C M P T)
BUFFALO—McKesson and Robbins, Inc. (C M P T)
EDGEMERE—Hógan Industrial Supply (P T)
GLOVERSVILLE—Eastern Chemicals, S. H. Ireland Div. (C M)
KEARNY—American Chemicals, Incorporated (C M P T)
LONG ISLAND CITY—Peerless Oil and Chemical (C M P T)
NEW YORK—American Chemicals, Inc. (C M P T)
NEW YORK—McKesson and Robbins, Inc. (C M P T)
POUGHKEEPSIE—Duso Chemical Company (C)
RENSSELAER—Eastern Chemicals, Inc. (C M)
ROCHESTER—Chemical Sales Corporation (C M P T)
SYRACUSE—Eastern Chemicals, Inc. (C M)
UTICA—Monarch Laboratories (C M P)

NORTH CAROLINA

CHARLOTTE—F. H. Ross and Company, Inc. (C M P T)
CHARLOTTE—Moreland Chemical Company (C M P T)
CHARLOTTE—Southern States Chemical Co. (C M P T)
GREENSBORO—F. H. Ross and Company, Inc. (C M P T)

OHIO

AKRON—Farley Solvents Company (C M P T)
AKRON—C. P. Hall Company (C P T)
CANTON—Bison Corporation (C P)
CINCINNATI—Amsco Solvents and Chemicals (C M P)
CINCINNATI—Chipman Supply Company (T)
CINCINNATI—Herbert Chemical Company (P T)
CINCINNATI—McKesson and Robbins, Inc. (C M P T)
CLEVELAND—Man-Gill Chemical Company (C P T)
CLEVELAND—McKesson and Robbins, Inc. (C M P T)
CLEVELAND—National Solvents Corporation (C P T)
CLEVELAND—Ohio Solvents and Chemicals, Inc. (C M P)
CLEVELAND—R. W. Renton Company (C P T)
COLUMBUS—McKesson and Robbins, Inc. (C M P T)
DAYTON—Industrial Chemical Products Co. (C P T)
DAYTON—Ottoson Solvents, Inc. (T)
LIMA—Thomson Chemical Company (C P T)
TOLEDO—Inland Chemical Co. (C M P)
TOLEDO—Toledo Solvents and Chemicals (C M P)
TOLEDO—M. I. Wilcox Company (C P T)
YOUNGSTOWN—Rhiel Supply Company (C M P T)

OKLAHOMA

OKLAHOMA CITY—Barada and Page, Inc. (C M)
TULSA—Barada and Page, Inc. (C M)
TULSA—Chemical Products, Inc. (C M P T)

OREGON

PORTLAND—Van Waters and Rogers (C M P)

PENNSYLVANIA

CONSHOHOCKEN—American Mineral Spirits (C M P T)
EASTON—Lehigh Valley Chemical Company (C M P T)
ERIE—Monarch Laboratories (T)
McKEES ROCK—Apex Soap and Sanitary Corp. (C P T)
PHILADELPHIA—Alex C. Fergusson Company (C P T)
PHILADELPHIA—McKesson and Robbins, Inc. (C M P T)
PHILADELPHIA—Phillips and Jacobs, Inc. (C M)
PHILADELPHIA—Pioneer Salt Company (C M P T)
PHILADELPHIA—George Senn, Inc. (C M P T)
PITTSBURGH—Carmac Chemical Company, Inc. (C P)
PITTSBURGH—Carman-Pittsburgh Company (C P T)
PITTSBURGH—Dacar Chemical Products Company (C P T)
PITTSBURGH—Ft. Pitt Chemical Company (C M P)
PITTSBURGH—McKesson and Robbins, Inc. (C M P T)
READING—R. W. Eaken, Inc. (C P T)
READING—Textile Chemical Company (C P)
SCRANTON—Scranton Chemical Company (C P T)
YORK—Industrial Solvents and Chemicals (C P T)

RHODE ISLAND

PROVIDENCE—George Mann and Company (C M P T)
PROVIDENCE—Sessions-Gifford Company, Inc. (C M P T)

SOUTH CAROLINA

CHARLESTON—Burris Chemical Company (C P T)
GREENVILLE—F. H. Ross & Company (C M P T)
GREENVILLE—Southern States Chemical Co. (C M P T)
SPARTANBURG—Moreland Chemical Company, Inc. (C M P T)

TENNESSEE

CHATTANOOGA—Chapman Chemical Co. (C M P T)
CHATTANOOGA—Wilson Sales Company (C M P T)
KINGSPORT—Chem-I-Dent, Inc. (C P T)
MEMPHIS—Chapman Chemical Company (C M P T)
MEMPHIS—C. P. Hall Company (C M P T)
MEMPHIS—Ideal Chemical and Supply Co. (C M P T)
NASHVILLE—Chapman Chemical Company (C M P T)
NASHVILLE—Wilson Sales Company (C M P T)

TEXAS

AMARILLO—State Chemical Company (C M P T)
AUSTIN—R. M. Hughes Company, Inc. (C M P T)
BEAUMONT—Arthur Dooley and Son (C M P T)
CORPUS CHRISTI—Barada and Page, Inc. (C M)
DALLAS—Barada and Page, Inc. (C M)
DALLAS—McKesson & Robbins, Inc. (C M P T)
DALLAS—Texas Solvents and Chemicals Co. (C)
DALLAS—Van Waters and Rogers, Inc. (C M P T)
EL PASO—Baron Chemical Company (C M P T)
EL PASO—Braun Chemical Company (C M P T)
EL PASO—Mine and Smelter Supply Company (P)
FORT WORTH—Barada and Page, Inc. (C M)
FORT WORTH—Worth Chemical Products Co. (C M P)
HOUSTON—Barada and Page, Inc. (C M)
HOUSTON—W. H. Curtain and Company (P)
HOUSTON—Dixie Chemical Company (C M P T)
HOUSTON—R. M. Hughes Company, Inc. (C M P T)
HOUSTON—McKesson, Texas Chemical Division (C M P T)
HOUSTON—Texas Solvents and Chemicals Co. (C M P)
HOUSTON—Van Waters and Rogers, Inc. (C M P T)
LUBBOCK—State Chemical Company (C M P T)
MIDLAND—State Chemical Company (C M P T)
ODESSA—Barada and Page, Inc. (C M)
SAN ANTONIO—R. M. Hughes Company, Inc. (C M P T)
SAN ANTONIO—McKesson and Robbins, Inc. (C M P T)

UTAH

SALT LAKE CITY—Braun-Knecht-Heimann Co. (C M P T)

VIRGINIA

NORFOLK—Taylor Salt and Chemical Company (C P T)
RICHMOND—Phipps and Bird, Inc. (C M P)
ROANOKE—Havnaer Supply Company (C M P T)

WASHINGTON

SEATTLE—Van Waters and Rogers, Inc. (C M P)
SPOKANE—Van Waters and Rogers, Inc. (C M P)

WEST VIRGINIA

CHARLESTON—B. Preiser and Company (C M P T)
FAIRMONT—Fairmont Machinery, Fairmont Supply (C P T)
HUNTINGTON—Cabell Chemical Company (C P T)

WISCONSIN

CHIPPEWA FALLS—Lyons Chemical (C M P T)
LA CROSSE—North Central Chemical, Inc. (M P T)
LA CROSSE—Wisconsin Solvents & Chemicals Corp. (C M P)
MADISON—North Central Chemicals (C M P T)
MILWAUKEE—McKesson and Robbins, Inc. (C M P T)
MILWAUKEE—Wisconsin Solvents and Chemicals (C M P)
WAUKESHA—Fred Portz and Son (C T)

See Your Distributor of Dow Solvents First!

WESTERN CONTROL CORP.

achieves three-way control with KEYSTONE WIRE

At their modern plant in Wichita, Kansas, Western Control Corporation produces flexible controls that are specified for many applications from lawnmowers to giant excavators. This wide range is the result of closely controlled quality and cost at Western Control. Western has successfully used Keystone MB Spring Wire since its inception in 1946. Here are some reasons they give:

CONTROL OF PRODUCTION — Keystone metallurgists worked with Western and developed a special quality of drawn galvanized spring wire for high speed coiling. Constant uniformity of MB Spring Wire means long production runs — increased productivity of machinery.

CONTROL OF QUALITY — Company officials report, "Uniformity of temper and size of Keystone MB Spring Wire gives us close inside and outside diameter tolerances. Coating, too, is superior — no flaking or stripping in the manufacturing process."

CONTROL OF COSTS — Keystone furnishes drawn galvanized MB Spring Wire to Western in pay-off packs. This means less waste — less set up time — less handling time — and cleaner wire. To Western, this means a quality product at a competitive price.

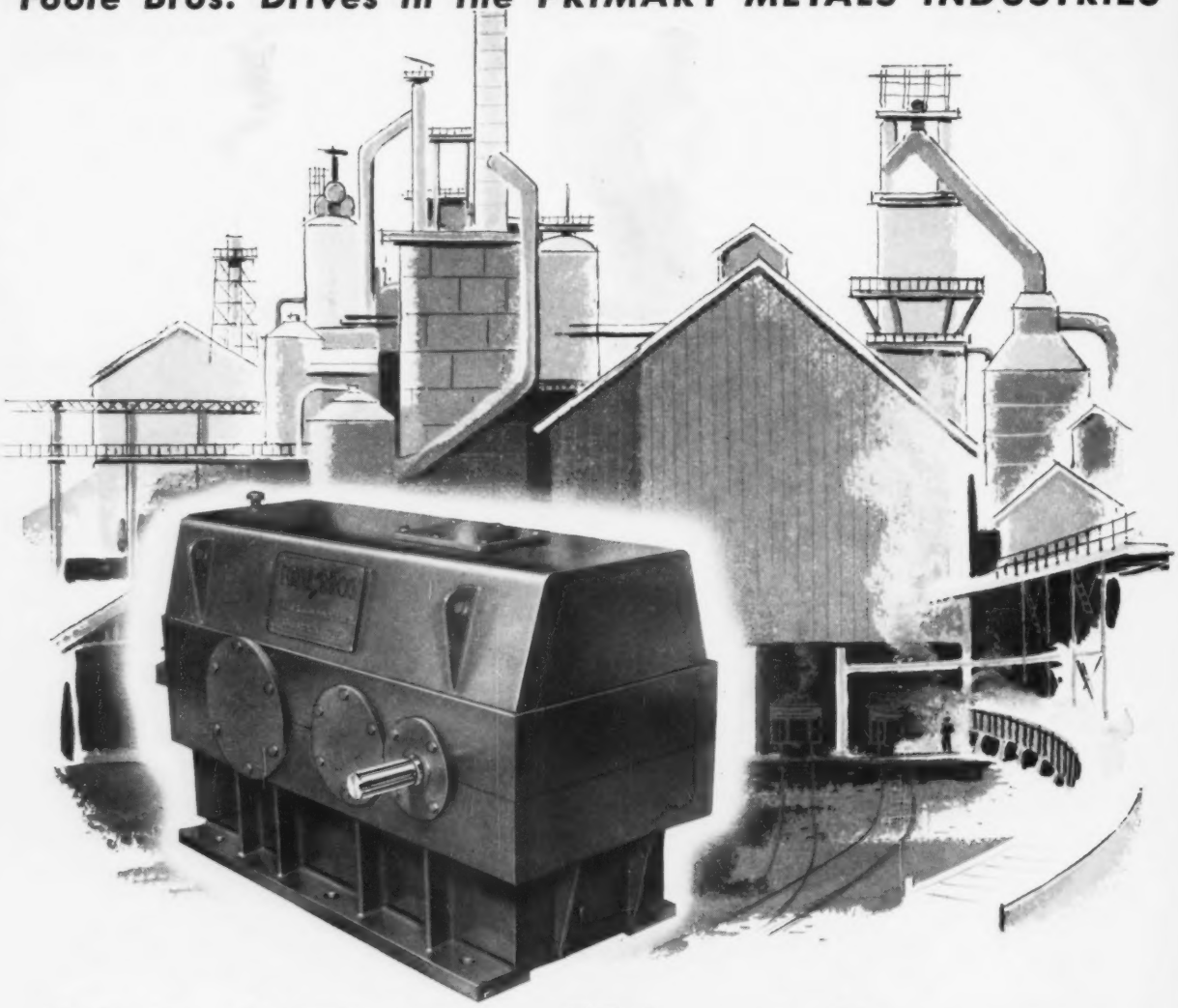
Could you benefit from our experience in solving difficult wire problems? Talk it over with your Keystone Wire Representative.

Keystone Steel & Wire Company, Peoria 7, Illinois

KEYSTONE

WIRE FOR INDUSTRY

Foote Bros. Drives in the PRIMARY METALS INDUSTRIES



ALL STEEL Maxi-Power...

maximum performance drive in a tough steel housing

Add a functionally designed and carefully engineered, high strength fabricated steel housing to the basic heavy duty Maxi-Power Parallel Shaft Helical Gear Drive components, and you get a unit that is capable of resisting severe external impact, in addition to delivering maximum performance.

Maxi-Power Drives are found in the Primary Metals Industries wherever power demands are heavy, and operating conditions require the ultimate in strength, stamina and efficiency.

The heavy, precision machined steel bed of these drives keeps broad faced helical gearing in precise alignment to provide a smooth, overlapping mesh with close backlash tolerances. Tooth deflection is uniform under the heaviest loads. Heavy duty anti-friction bearings are conservatively rated to handle severest shock loads.

Maxi-Power Drives are available in nine combinations of shaft assemblies to permit a variety of gear drive arrangements between the prime mover and driven equipment. Maxi-Power Drives are available in Single, Double, and Triple Reductions. Standard Ratios are from 2.08 to 1 and up to 360 to 1. Capacities to 1550 HP.

Why not get the complete story on Maxi-Power soon? Write for Engineering Manual MPB and full details on the All Steel Drive today.

100 YEARS SERVING INDUSTRY 1859-1959

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Better Power Transmission Through Better Gears

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He does a better job when he can see what he's doing

You increase operator efficiency as well as production when you use transparent, heavy-duty Sunicut cutting oils. Operators work better, because Sunicut oils let them see tools and workpieces, see the finish, see micrometer graduations.

Sunicut oils don't stain hands and clothing. They pump easily, wet metal fast, and give excellent extreme-pressure lubrication.

To prove to yourself the economy of Sun quality, ask your Sun representative to help you select the right grade of Sunicut for your heavy-duty cutting requirements. Or write to SUN OIL COMPANY, Dept. I-13, Philadelphia 3, Pa.

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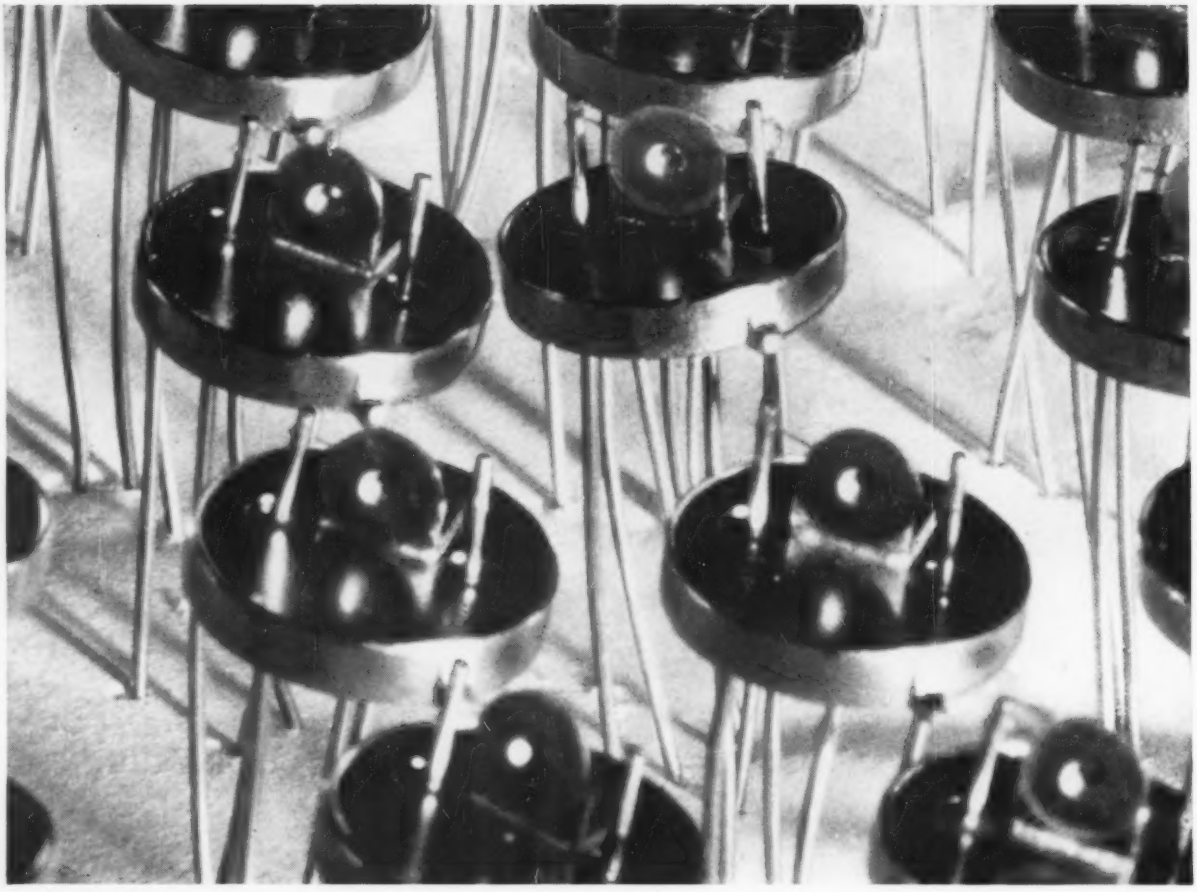
SUNOCO



IBM, Poughkeepsie, N. Y.: Critical alloying and bonding temperatures determine final operating characteristics of germanium transistors (above).

Alloying and bonding temperatures a problem?

Not at IBM, Poughkeepsie, N. Y., where Speedomax® H is helping alloy the "dots" and bond the "whiskers" in the manufacture of transistors for their data processing equipment. The right alloy and proper bond depend upon temperature . . . determine transistor operating characteristics. At IBM, Speedomax H is holding these critical temperatures to within 2 degrees F . . . reproducing desired processing conditions, again and again. Rugged, compact and thoroughly reliable, this modern controller is providing equally dependable control for many other heat treating processes . . . helping to produce both process economies and a quality product. *Whatever your heat treat, it'll pay you to investigate Speedomax H! For details, contact your nearest L&N office or write 4956 Stenton Ave., Phila. 44, Pa.*

LEEDS NORTHRUP
Instruments Automatic Controls • Furnaces

Operator loads CM furnace with tray of germanium wafers. Routine check with traveling thermocouple and Speedomax Type G AZAR recorder proves Speedomax H holds temperature gradient of soak zone to within 2 F.

NOW DIE BLOCKS and HOT WORK DIE STEELS made of VACUUM DEGASSED STEEL AT NO EXTRA COST TO YOU!

Another FINKL FIRST gives you these advantages:

REDUCED DOWNTIME

Finkl vacuum degassed steels result in die blocks and hot work die steels with greater ductility and toughness. This means size for size, and/or hardness for hardness, the degassed steel reduces the chances of breakage under severe operating conditions.

REDUCED DIE SINKING TIME

Finkl vacuum degassed steel die blocks and hot work die steels are cleaner, with about 50% fewer non-metallic inclusions, and consequently fewer tool regrinds are required. A higher lustre is possible in impressions if so desired.

POSITIVE DELIVERIES

Finkl vacuum degassed steel promotes high density centers in large die blocks, therefore reducing the possibility of a late shipment because of ultrasonic rejection.

DIE BLOCKS · FORGINGS · HOT WORK STEELS · ELECTRIC FURNACE STEELS

Finkl was first with die blocks fully water quenched. Finkl was first with deep hardening nickel-chrome-moly die blocks, the forerunner of the AISI 4300 Series. And now, we are pleased to add vacuum degassed steel die blocks and hot work die steels to our line of products—another Finkl First. They represent our policy of offering our customers every advantage to reduce costs and increase production.

For over 80 years we have produced quality products because we believe sincerely that the "best costs the least" in the long run. For impressions that last you can depend on Finkl.

A. Finkl & Sons Co.

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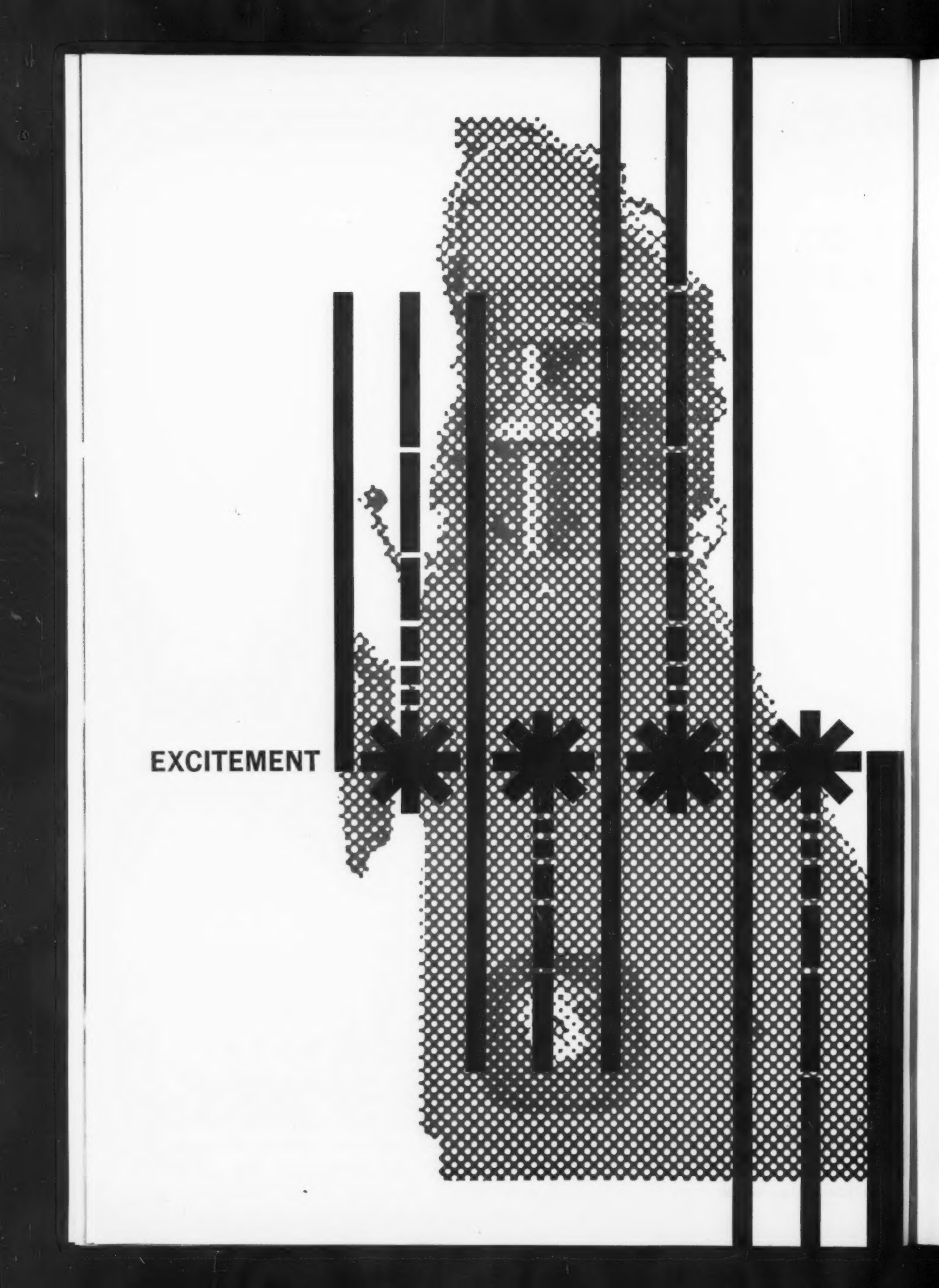
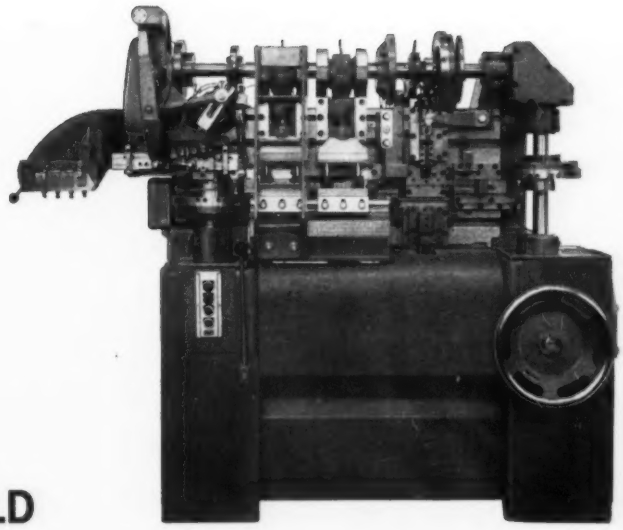

EXCITEMENT

Once in a blue moon, a really exciting new production machine is developed . . . and this is it! It's the Torrington **Verti-Slide** which promises a genuine revolution in the production of just about everything in strip forming that is now being produced by progressively tooled presses. Single-handed, the Torrington **Verti-Slide** has already demonstrated its ability to replace as many as six presses in high speed precision production of complex parts. Cooler heads than ours are telling **us** that it's the most exciting new development in its field in half a century.



IN THE PRODUCTION WORLD

Write or call today for complete data—or a Torrington sales engineer.

THE TORRINGTON MANUFACTURING COMPANY
TORRINGTON, CONNECTICUT · VAN NUYS, CALIFORNIA · OAKVILLE, ONTARIO

YOCAR BRINGS RAILROADS AND SHIPPERS

... that lower shipping costs,

1

NEW Gondola Hoods with *Shock-Spring* Coil Skid

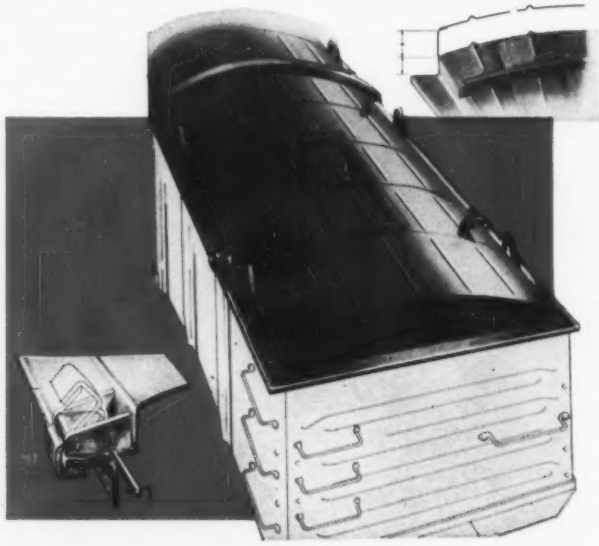
New, short-wall Yocar Hoods give greater protection . . . fit tighter, handle easier, even in low height-clearances. Balanced Lift Bracket makes lifting easy . . . storing convenient. NEW Shock-Spring COIL SKID has deeper coil-well for positive cradling . . . new-type cross-member Retainer Bar locks coils securely for maximum damage protection . . . Skid and Retainer Bar surfaces are Oak-lined for extra safety. Skid under-frame is all-welded steel construction with built-in inspection hatch; rugged shock-spring bracing at car ends cushions roughest "humping."

Two Hoods make a car set . . . available in new low-ceiling size with Shock-Spring Skid, or in Standard, high-side models that fit all skid-equipped Gondola cars.

2

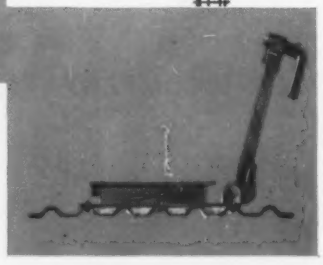
NEW Gondola Roofs

Economical, these rigid, all-steel curved-top GONDOLA ROOFS are beaded for extra durability. Roof height is varied to meet A.I.S.I. 48-inch standards. Overlapping lip in center section fits to two adjoining end sections; better weather protection for steel bars, sheets, plates, tubing; rugged swing-out lock prevents catching, lowers maintenance cost; stack-easy brackets permit easier storing. Manway doors, catwalk, special height angles optional.



3

Door in locked position; fits roofs, hoods, containers regardless of types of surface.



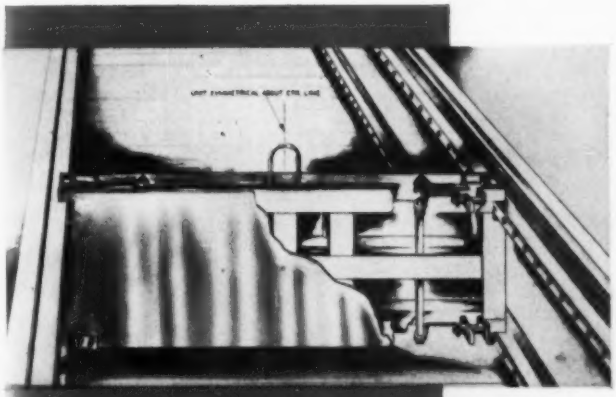
Door open shows seal application on beaded car surface.

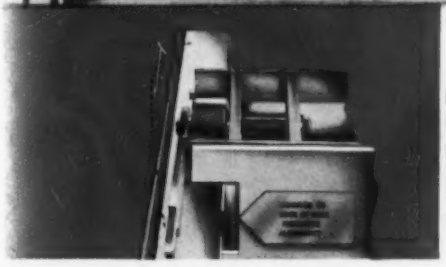
NEW Manway Doors

Yocar's new low-cost inspection doors solve covered Gondola inspection problems . . . fit all types of car surfaces, apply to vertical or horizontal areas . . . minimize bad-order cars. Special foam rubber and rubber sealing gasket are completely weather-tight . . . spring-loaded locking handle is built to "take it."

FIVE NEW DAMAGE CONTROL DEVICES

cut damaged shipments, save man-hours



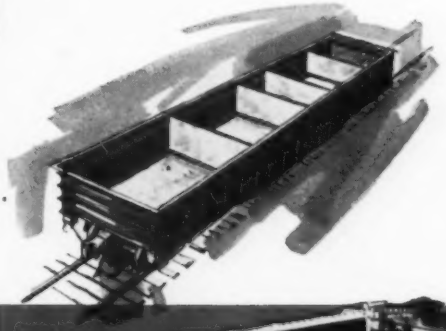


Eccentric rollers permit bulkhead to rest weight on applied "Zee" track . . . protecting against flat surfaces and bearing wear . . . this feature optional.

4

NEW RoLLoK Movable Bulkheads

. . . cut installation time in half with new "Zee"-section tracks at top and bottom of car walls; bulkhead positions easily on case hardened rollers; over-sized locking pins allow for car wall distortion . . . swivel crank operates locking pins quickly and safely. Meets A.I.S.I. standards . . . steel or wood facings available . . . bulkheads are in car sets to meet any requirement.



5

ECONO-GUARD

...low-cost steel anchor-wall liners

ECONO-GUARD adds years to car wall life . . . saves lift truck damage . . . gives extra car strength, keeping cars in service longer . . . provides greater damage protection to shipments with over 200 "Safe-Cargo" anchoring pins. Ask about SAFE-CARGO anchor belt rails for PIGGY-BACK trailers.

Visit us at the A.R.S.A. Convention, Booth 179, Sept. 20-22, Hotel Sherman, Chicago

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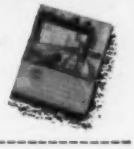
SAFE-CARGO®

LOW COST, POSITIVE DAMAGE CONTROL

YOUNGSTOWN STEEL CAR CORP.
NILES, OHIO

A quality name in railroad product engineering for more than forty years

Dept. DPF #1
Youngstown Steel Car Corp., Niles, Ohio
Please send your new Damage-Control booklet, "Clear Track to Clear Profits." We are interested in applications of these new devices.



Your name: _____

Title: _____

Company name: _____

Address: _____

City: _____ Zone: _____ State: _____

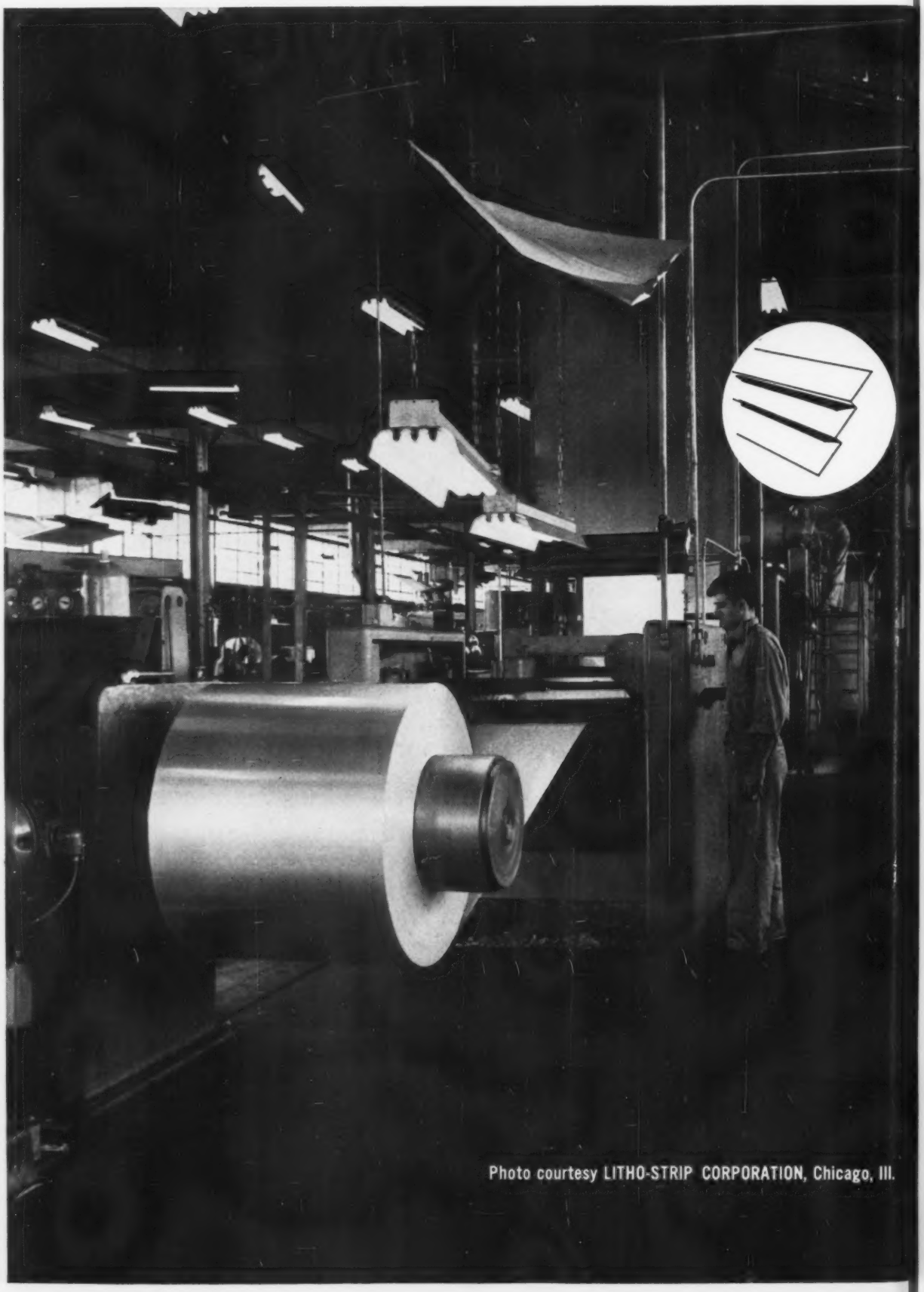
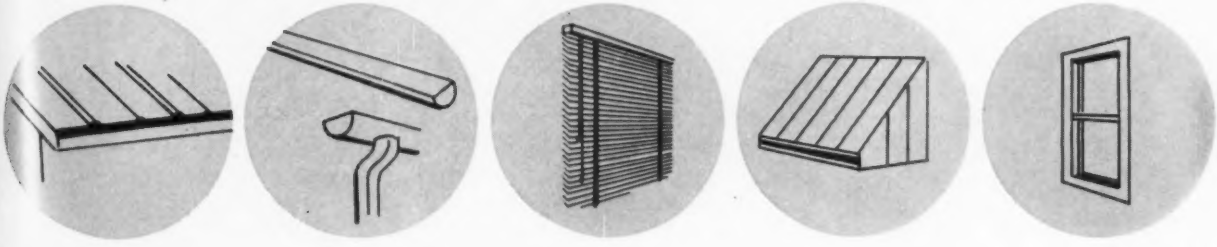


Photo courtesy LITHO-STRIP CORPORATION, Chicago, Ill.

BONDERIZED ALUMINUM

makes your painted products look better longer



Most famous of all surface treatments for metals—BONDERITE—makes painted aluminum look better longer.

Bonderite on aluminum means fine appearance longer, because it controls corrosion and anchors the paint.

Bonderized and painted aluminum is produced on automated strip lines in which the metal is cleaned, Bonderized and painted, then re-coiled ready for use.

Stamped or roll-formed products are made from pre-painted, Bonderized aluminum coil without loss of paint adhesion, even from the most severe deformation. Here's production efficiency and economy at its best—better products at less cost.

Many Applications of Bonderite for Aluminum

There's more than one type of Bonderite for use on aluminum. In wide use is Bonderite as a base for paint, which adds durability and long life to paint finishes on so many aluminum products.

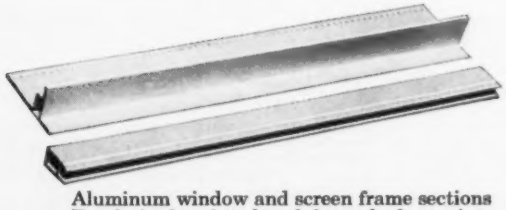
Another Bonderite produces an attractive green coating, used on many architectural products without further finish.

Protection without changing the characteristic color of the metal is provided by another Bonderite.

There is also a Bonderite, formulated for mixed production, which coats aluminum, steel and zinc.

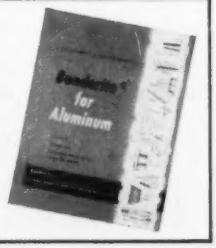
Bonderite for aluminum meets and exceeds the requirements of Government Specification MIL-C-5541.

Well over two hundred plants—large, medium-sized and small—use these great Parker products on their aluminum production. Better investigate for *your* plant, today!



Aluminum window and screen frame sections Bonderized, painted and formed after painting. No breaks in finish anywhere! (Courtesy, Security Co., Detroit, Mich.)

SEND FOR ILLUSTRATED BULLETIN!—*Free bulletin, with more complete information and details, mailed immediately upon request. Ask for Bulletin A6790, "Bonderite for Aluminum."*



Parker Rust Proof Company

2197 E. MILWAUKEE, DETROIT 11, MICHIGAN

BONDERITE corrosion resistant paint base	BONDERITE and BONDERLUBE aids in cold forming of metals	PARCO COMPOUND rust resistant	PARCO LUBRITE—wear resistant for friction surfaces	TROPICAL—heavy duty maintenance paints since 1883

**Bonderite, Bonderlube, Parco, Parco Lubrite—Reg. U.S. Pat. Off.*

Now! Tests prove

CONTOUR-WELDED* STAINLESS TUBING

gives products better protection against contamination

This tubing is smoother inside – so there's less danger of product incrustation. And this means better protection against contamination. Not only that, a smoother surface also ensures greater resistance to corrosion and longer fatigue life.

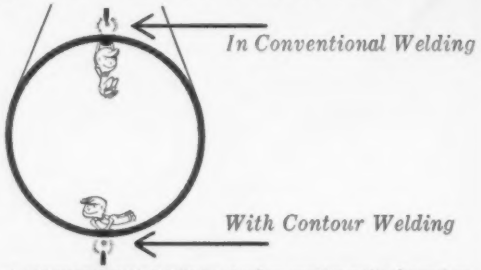
Here's why TRENTWELD® tubing, made by the exclusive *Contour-Weld* process, is smoother than any other tubing:

First, it's smoother than seamless tubing because it's formed from uniformly rolled strip steel whereas seamless is extruded from a billet.

Second, it's smoother than other welded tubing because the Trent-patented *Contour-Weld* process virtually eliminates the weld bead.

But get full details on why smoother tubing surfaces are vital. Send for the free 48-page "Trentweld Manual." It contains complete data on *Contour-Welded* tubing in stainless and high alloy steels, titanium, zirconium, zircalloy and Hastelloy†, in sizes from ⅛" to 40" O.D. Write: Trent Tube Company, Box 2518, Pittsburgh, Pa.

†Trademark Haynes Stellite Co.



In **CONVENTIONAL WELDING** of tubes, gravity pulls the molten metal down to form a bead that is difficult to remove by cold working. And cold working may lead to undercuts, focal points for fatigue cracks and corrosive attacks. Cleaning becomes difficult.

*With **CONTOUR-WELDING** the tube is welded at the bottom. Gravity still pulls the molten metal down inside the tube, but now the weld area corresponds to the contour of the tube. There's virtually no weld bulge on the inside surface. And even on the O.D., the weld seam more closely conforms to the contour of the tubing.

CONTOUR TRENTWELD

stainless and high alloy pipe and tubing

TRENT TUBE COMPANY

Subsidiary of Crucible Steel Company of America • GENERAL OFFICES: East Troy, Wisc. • MILLS: East Troy, Wisc.; Fullerton, Calif.

40-ton cab-in-front model Plymouth Diesel equipped with Torqomotive Drive hauls wood from yard to mill for Consolidated Water Power & Paper Company.

PLYMOUTH DIESELS CUT OPERATING COSTS... FOR AMERICA'S LEADING PAPER COMPANIES

Hauling wood, returning empties, and spotting cars for loading—under all types of operating conditions—Plymouth Diesels help to keep operating costs down for America's leading paper companies. Less servicing cuts down-time. Compact size cuts fuel costs, improves maneuverability. Easier, cleaner operation reduces operator fatigue, improves visibility and safety.

Among the dozens of Plymouth units now on the job in the Paper Industry is the Plymouth Model "W" shown above, currently in use at Consolidated Water Power & Paper Company, Wisconsin Rapids, Wis.

Find out today how a Plymouth Diesel can cut operating costs for you. Simply send a brief outline of *your* operations to: The Fate-Root-Heath Company, Dept. A-2, Plymouth, Ohio. Purchase Plans are available.

RAIL POWER

PLYMOUTH® LOCOMOTIVES

WITH TORQOMOTIVE DRIVE

ALSO BUILDERS OF F-R-H CERAMIC MACHINERY

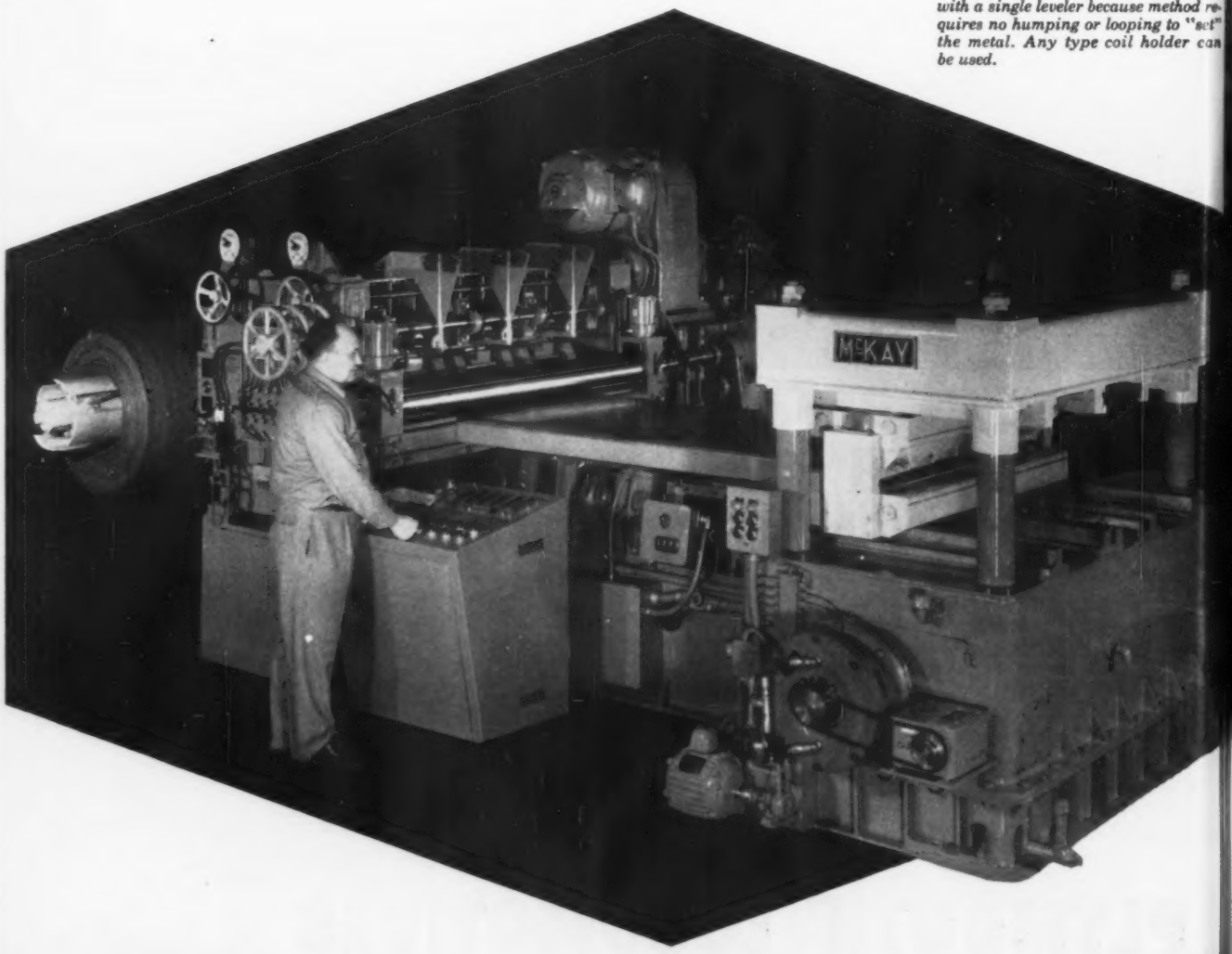
PLYMOUTH LOCOMOTIVES in Progressive Industry throughout the world

AUTOMATIC, INSTANTANEOUS *because of highly accurate electronic counting and measuring mechanisms. Operator simply sets length and quantity by push buttons, shear does the rest. Punched tape or coded card control available.*

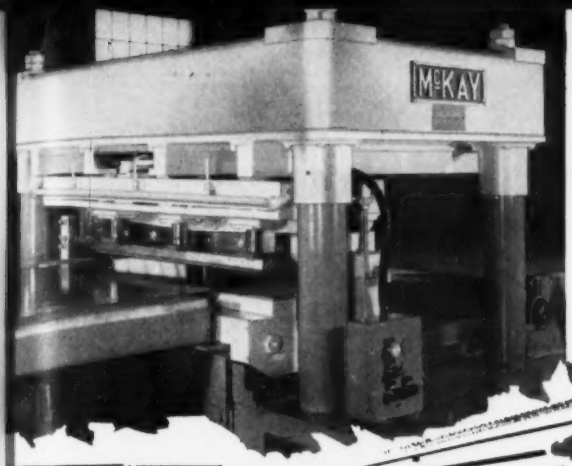
LOW MAINTENANCE *because all drives and controls are simplified AC type, electronic controls are proven standards, cutting dies are standard double-rake shear knives.*

Break

COMMERCIALLY FLAT SHEET *is possible with a single leveler because method requires no humping or looping to "set" the metal. Any type coil holder can be used.*



COMPACT . . . *never before has such a high production unit required so area. Space saving, it's ideal for warehouse operations.*



k through...

in AUTOMATIC SHEARING

Revolutionary McKaymatic* high production Die Shear line instantly responds to length and Quantity Command

Now—a high production cut-to-length line that meets *all* the requirements of modern day coil shearing. It's the revolutionary new McKaymatic* Die Shear Line and it's fast, extremely accurate, instantly adjusted, compact and relatively low in cost!

The McKaymatic* is applicable for use wherever sheet metal is used. Ferrous and non-ferrous mills, fabricators or warehouses should see this amazing new line before they decide on the purchase of new coil shearing equipment.

UNMATCHED FLEXIBILITY offered by a simplified electronic control makes the changing of length of cut instantaneous. When length and quantity commands are changed (manually or automatically) the line reacts instantaneously without slowing down or stopping. EXACTING ACCURACY, also a product of electronics, is equal to or better than any other available equipment. HIGH PRODUCTION, regardless of the number of length changes is possible because there is no downtime for length changing, etc. LOW MAINTENANCE is possible because the line is designed around simple AC drives and controls, and proven electronic components.

There's nothing like it—for large orders or small—in any width or thickness. Here for the first time is practical push button shearing, and it's easily adapted for standard coded card or punched tape systems. For details write today. *The McKay Machine Company, Youngstown 1, Ohio.* *TM

McKAY McK MACHINE

use Airco's new Dip Transfer† *CO_2 Process***

for **ALL-POSITION WELDING OF STEEL IN ALL THICKNESSES**

low costs • easy fit up • high speed • very low spatter • no warpage

In welding mild sheet steel manually, there's only *one way to reduce costs and produce high quality welds* at the same time. Airco Dip Transfer CO_2 Process Welding. Let's be specific: –

- The complete Airco Dip Transfer CO_2 package welds in all positions . . . manually!
- Welds are hydrogen-free.
- Virtually ends warpage – only low average currents are used for burn off.
- Creates little or no spatter.
- Handles typical steel joint fit ups.
- No flux needed.
- Penetrates deeply – critical for high quality.
- Welds much faster than flux-based processes.
- Uses money-saving Pureco CO_2 as shielding gas.
- The basic equipment welds all weldable metals.

The Airco Dip Transfer CO_2 Process gives you consistently *high quality* welds at *lower costs* than any other process. For complete information, phone or write your nearest Air Reduction Representative. Ask for the new 24-page "AIRCOMATIC CO_2 WELDING" Catalog.

Pureco CO_2 is supplied by the Pure Carbonic Company, a division of Air Reduction Company, Incorporated.
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200-ton Hydraulic Bulldozer for Massey-Harris-Ferguson, Ltd.

The proven work horse
for bending, forming and forging —

WILLIAMS-WHITE BULLDOZERS

Williams-White, originator of the bulldozer, makes them a little bit stronger, a little bit more versatile, and more accurately and easily controlled. Full range of 50 to 500 ton standard self-contained hydraulic models, or individually engineered and built to meet your special requirements. *Request Bulletin No. 73* for data and specifications.

106th year

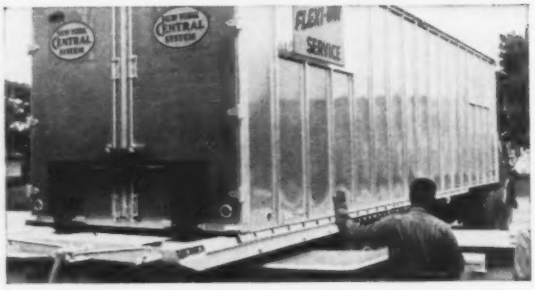
WILLIAMS-WHITE & CO • MOLINE, ILLINOIS

When you buy a machine you buy creative engineering skills and craftsmanship. Among your chief considerations should be the record and integrity of the maker.

BULLDOZERS PRESSES SHEARS BENDERS PUNCHES HAMMERS

SALES AGENTS: Portland, Ore.: Allied Northwest Machine Tool Corp.; **Los Angeles:** Engen Industrial Co.; **Philadelphia:** Edward A. Lynch Machinery Co.; **Milwaukee:** Pagel Machinery Co.; **Seattle:** Perine Machinery & Supply Co., Inc.; **Chicago:** Polhemus-Miller Co.; **Pittsburgh:** Frank Ryman's Sons; **Cincinnati, Columbus** and **Dayton:** Seifreat-Elstad Machinery Co.; **St. Louis, Kansas City** and **Tulsa:** Robert R. Stephens Machinery Co.; **Buffalo:** H. D. Thweatt Co.

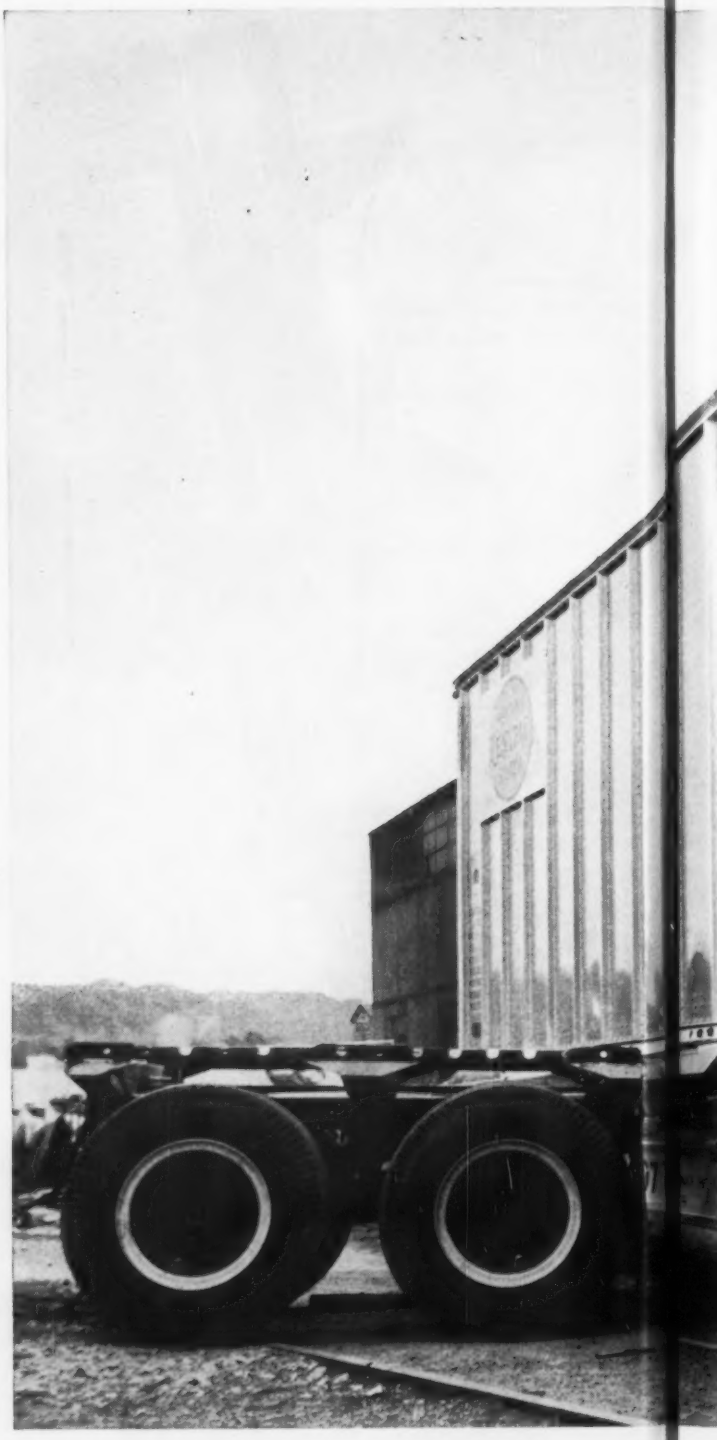
BACK IT UP



SLIDE IT OFF

SWING IT AROUND

They leave their wheels behind... trailers ribbed with sturdy Flynn extrusions



Like other modern railroads, the New York Central carries truck trailers. But they don't take along the wheels. For their truck-train arrangement, they use Flexi-Vans. These advanced trailers slide off their undercarriages and onto special Flexi-Van railroad cars. At their destination, they shift onto a new set of wheels. Result: more payload per pound carried.

Strick Trailer already has manufactured 300 special Flexi-Van railroad cars and 1,000 Flexi-Van trailers for the New York Central. For sideposts, top rails, and bottom rails, they use extruded shapes of Flynn aluminum. Although these parts are lightweight, they provide the strength and rigidity necessary to make up for the absence of a fixed undercarriage.

Flynn's advantages go beyond the ability to turn out extrusions of maximum strength and minimum weight . . . in large or small quantities, stock or custom profiles. Flynn has a reputation for reliability. For fast, as-promised deliveries. For strict adherence to specifications. You can *rely* on Flynn.

Write today for ideas relating to your own product.

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Aluminum Division

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MULTIPLE FEED-OUT

Permits Greater Job Versatility and Added Profits

Greenlee Standard and Special Machine Tools

- Multiple-Spindle Drilling and Tapping Machines
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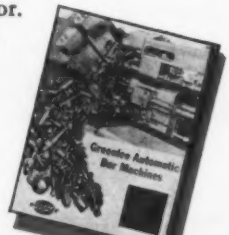
- Six and Four-Spindle Automatic Bar Machines
- Hydro-Borer Precision Boring Machines
- Die Casting Machines

Greenlee Air-Feed Automatics give you a competitive edge. The multiple feed-out arrangement offers a distinct profit advantage in machining many types of parts. Threads and oil grooves may be rolled on any portion of long shafts. Finish forming may be done on either end. See your Greenlee Distributor. He'll show you how Greenlee Air-Feed Automatics will pay off for you.



Write today for Catalog A-405 — first step on the way to more profitable production with Greenlee Automatic Bar Machines.

GREENLEE BROS. & CO.

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Call Crucible for stainless of uniform excellence

The lustre of Crucible stainless is achieved through precision-rolling on modern mills. Uniform physical properties are maintained by checking each heat — while electronic measuring controls ensure accurate gauge. Such methods produce coil after coil of uniform excellence. For stainless in all gauges down to .010″ and in all strip widths, call or write: Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.

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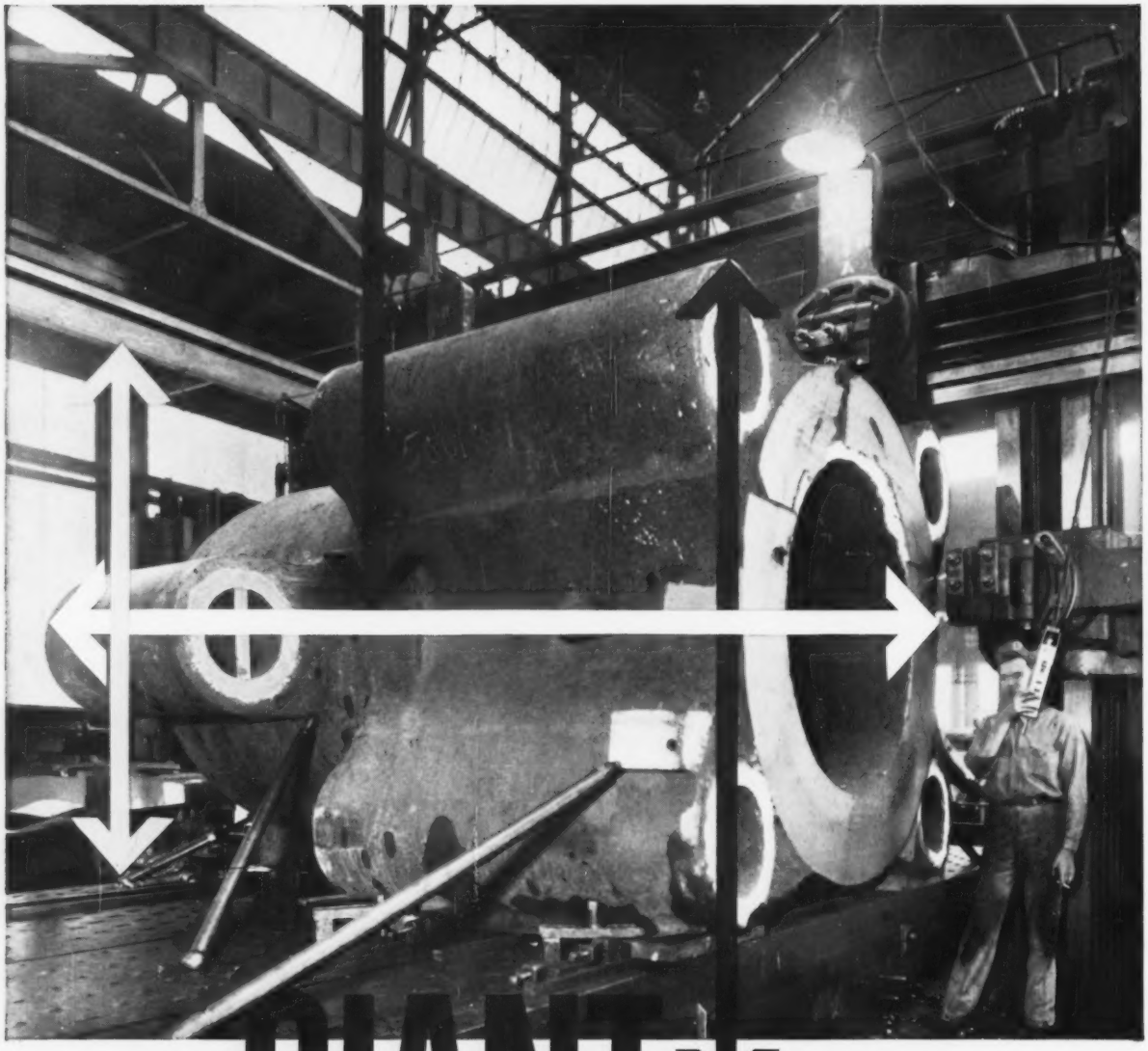

GIANT

IN THE MAKING

Machining a giant press cylinder... The machining of this huge casting or the building of a complete machine, large or small, is the type of machine work regularly performed in SUN SHIP machinery plant where marine and industrial machinery is built.

We solicit jobbing machine work. Inquiries to our Sales Engineering Department will receive prompt attention.

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SHIPBUILDING & DRY DOCK COMPANY

ON THE DELAWARE • SINCE 1916 • CHESTER, PA.

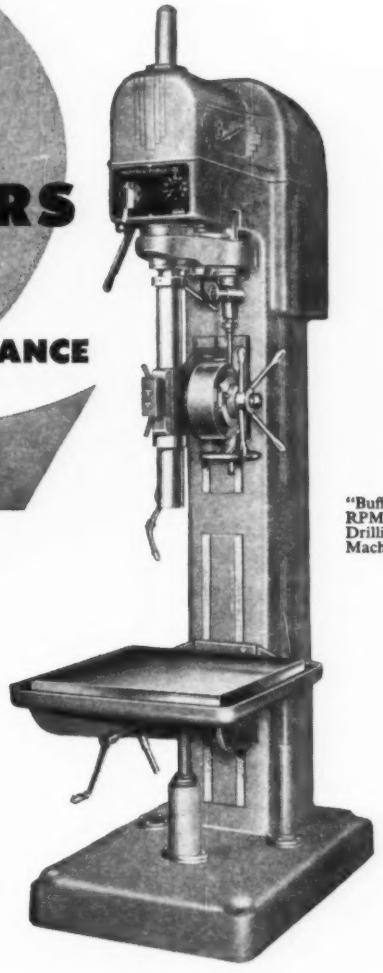
"6-in-1" Machine Pays for Itself—Fast!

"Buffalo" Universal Iron Worker

For production shops, or for those with maintenance work, the "Buffalo" Universal Iron Worker takes the space of only **one** machine (and requires only a **one**-machine investment) yet it does the work of **six** machines. It's a great space-, time-, work- and money-saver. The UIW rapidly notches, punches, shears, miters, slits, cuts, copes. It handles angles, tees, channels, bars and flats at fast production rates. Performs up to three jobs at once, thus saving time and labor. Ruggedly built with heavy welded steel frame for dependable service. See how the "Buffalo" Universal Iron Worker can save money for you! Write for Bulletin 360-G.

2 MONEY-MAKERS

FOR PRODUCTION OR PLANT MAINTENANCE



"Buffalo" RPMster Drilling Machine

Drilling Speed Changes Unlimited!

Since "Buffalo" pioneered the "RPMster" it has earned an industry-wide reputation as the outstanding variable speed drilling machine. Now, new improvements make this versatile drill even more productive and profitable to use. One is the exclusive "Buffalo" Torque Controlled Power Feed. This permits maximum speed and feed for the size hole being drilled without concern over damage to drill or machine gearing. The "RPMster" has been redesigned for greater capacities, ranging from 1" to 2" in mild steel. For a revelation in drilling ease, smoothness and high productivity, be sure to investigate the "Buffalo" RPMster. Write for Bulletin 3257-B.

For complete facts on these "money-making machines", call your "Buffalo" machine tool dealer. Or write us direct.

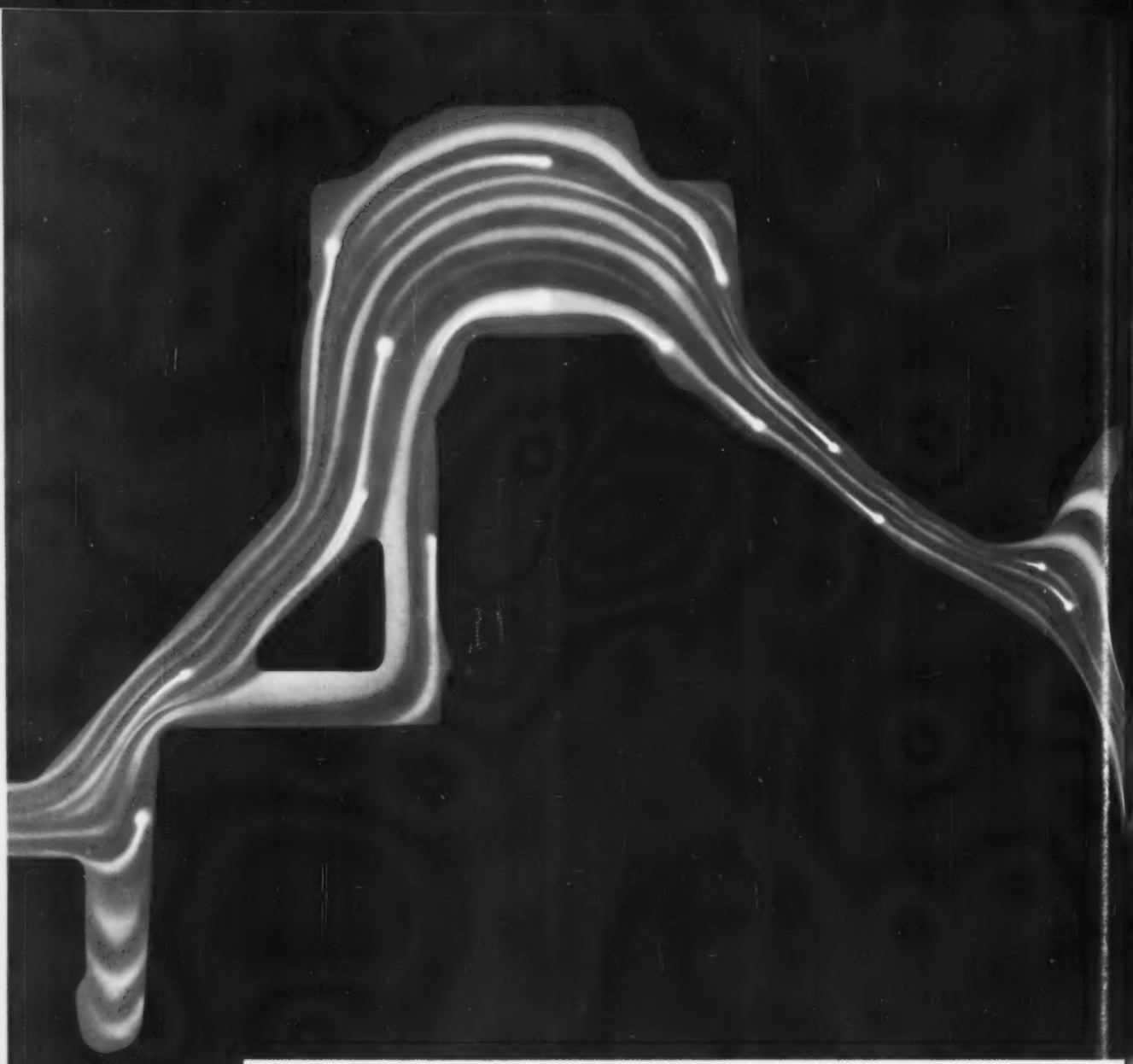
ESTABLISHED 1877 "Buffalo" MEMBER N.M.T.B.A.

BUFFALO FORGE COMPANY

492 Broadway • Buffalo, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING PUNCHING SHEARING BENDING



Fluid mapper pattern demonstrating liquid flow through a cross section of a Malleable differential carrier.

Versatility is Malleable

The ability to do most any job well is synonymous with Malleable iron castings. The variety of tasks they perform, from the commonplace to the spectacular, is legend. The strength and toughness . . . the freedom of design . . . the wide range of shapes and sizes . . . the excellent machinability . . . the economies achieved . . . all these advantages of Malleable combine to create an unexcelled reputation for versatility.

Whatever your needs, look first to Malleable.

For information or service, call on one of the progressive firms that identify themselves with this symbol—

MEMBER
MALLEABLE
CASTINGS COUNCIL

If you wish, you may inquire direct to the Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio, for information.

Versatility Is Key to Malleable's Increasing Use

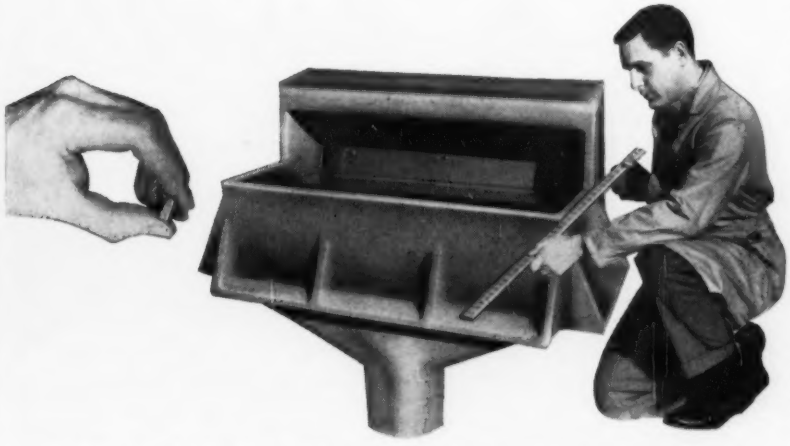
Recent metallurgical advances have made the Malleable irons a family of metals uniquely capable of meeting the most diverse design, production and performance requirements. Whether the vital consideration is high strength, toughness, ductility, hardness, machinability, high or low temperature performance, wear resistance, or economy and adaptability for complicated designs, Malleable castings have the versatility to meet exacting specifications.

For versatility of shape, the casting process is unexcelled. It permits direct production of the most complicated components. The metal is placed exactly where it is needed regardless of the intricacy of the design.

The capabilities of the metal to be cast are of even greater significance, for every application has a different set of requirements. Here, Malleable iron provides unique opportunities to obtain better parts at less cost.

Holes can be punched in Malleable, surfaces can be coined to meet rigid specifications. The pearlitic Malleables can be surface-hardened for even better wear resistance. These and other advantages make today's Malleable iron one of the most versatile engineering materials available.

Although Malleable iron's properties are flexible, depending on service requirements, certain relationships remain constant. Malleable provides more strength and toughness per dollar than any other metal. It is also the most machinable of all ferrous metals of similar properties.



Malleable castings can be produced in sizes ranging from the hammer handle wedge, shown here, weighing less than an ounce, to the 1,125 pound bridge scupper. Throughout this range is an endless variety of castings, best made of Malleable for highest quality at lowest cost.

Shapes and sizes of Malleable castings are virtually limitless. The combination of Malleable's good castability with modern production techniques regularly results in sections as thin as 1/16" and tolerances of ±.005" per inch in sections of 1", with excellent surface finishes.

Engineering Aids Available

While the design of Malleable castings is not complicated, it will pay you to consult a skilled Malleable engineer who can offer time and cost saving suggestions for the production of better parts. As another aid to basic Malleable casting design, a special folder — *Data Unit 104 — Design Versatility* — is available from any member of the Malleable Castings Council and from the Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio.

These companies are members of the

MALLEABLE CASTINGS COUNCIL

CONNECTICUT
Connecticut Mall. Castings Co., New Haven 6
Eastern Malleable Iron Co., Naugatuck
New Haven Malleable Iron Co., New Haven 4

DELAWARE
Eastern Malleable Iron Co., Wilmington 99

ILLINOIS
Central Fdry. Div., Gen. Motors, Danville
Chicago Malleable Castings Co., Chicago 43
Moline Malleable Iron Co., St. Charles
National Mall. and Steel Castings Co., Cicero 50
Peoria Malleable Castings Co., Peoria 1
Wagner Castings Company, Decatur

INDIANA
Link-Belt Company, Indianapolis 6
Muncie Malleable Foundry Co., Muncie
Terre Haute Mall. & Mfg. Corp., Terre Haute

MASSACHUSETTS
Belcher Malleable Iron Co., Easton

MICHIGAN
Albion Malleable Iron Co., Albion
Auto Specialties Mfg. Co., Saint Joseph
Cadillac Malleable Iron Co., Cadillac
Central Fdry. Div., Gen. Motors, Saginaw

MINNESOTA
Northern Malleable Iron Co., St. Paul 6

NEW HAMPSHIRE
Laconia Malleable Iron Co., Laconia

NEW JERSEY
Meeker Foundry Company, Newark 4

NEW YORK
Acme Steel & Mall. Iron Works, Buffalo 7
Frazer & Jones Company Division Eastern Malleable Iron Co., Solvay
Oriskany Malleable Iron Co., Inc., Oriskany
Westmoreland Mall. Iron Co., Westmoreland

OHIO
American Malleable Castings Co., Marion
Canton Malleable Iron Co., Canton 5
Central Fdry. Div., Gen. Motors, Defiance
Dayton Mall. Iron Co., Ironton Div., Ironton
Dayton Mall. Iron Co., Ohio Mall. Div., Columbus 16
Maumee Malleable Castings Co., Toledo 5
National Mall. and Steel Castings Co., Cleveland 6

PENNSYLVANIA
Buck Iron Company, Inc., Philadelphia 22
Erie Malleable Iron Co., Erie
Lancaster Malleable Castings Co., Lancaster
Lehigh Foundries Company, Easton
Meadville Malleable Iron Co., Meadville
Pennsylvania Malleable Iron Corp., Lancaster

TEXAS
Texas Foundries, Inc., Lufkin

WEST VIRGINIA
West Virginia Mall. Iron Co., Point Pleasant

WISCONSIN
Badger Malleable & Mfg. Co., S. Milwaukee
Belle City Malleable Iron Co., Racine
Chain Belt Company, Milwaukee 1
Federal Malleable Company, West Allis 14
Kirsh Foundry Inc., Beaver Dam
Lakeside Malleable Castings Co., Racine
Milwaukee Malleable & Grey Iron Works, Milwaukee 46

Remember CLAYMONT fo

TO fabricators and equipment manufacturers, the Image of CF&I means single-source service for many of their steel plate requirements. This giant steelman reflects the integrated steel production and plate fabricating facilities of CF&I's Claymont, Delaware plant.

Claymont makes its own steel, rolls its own plate and performs every plate-fabricating operation, exercising step-by-step quality controls within the Claymont plant. Consequently, steel plate availability is no problem, and customer specifications are met exactly.

Small or large-quantity orders are handled with equal facility. Quick shipments from stocks are available on many items, and delivery promises are kept on special-to-order production.

Whether you need an added source or want a single source for steel plates and steel plate products, contact Claymont. Full details and prompt service are available through any CF&I sales office—and there's one near you.

T for steel plates... heads... fabricated plate products

Claymont Steel Plates

CARBON—to all standard ASTM and AISI specifications.

ALLOY—including nickel-bearing ASTM specifications A-203 and A-353 for liquid oxygen storage and other low temperature applications . . . "chrome-moly" ASTM specification A-387 (all grades) for high temperature and high pressure applications . . . as well as ASTM specifications A-202, A-204, A-225, A-302 and AISI specifications 4140 and 4130.

STAINLESS-CLAD—provides the same protection against corrosion, abrasion and contamination as solid stainless—*plus* the economy of carbon steel backing plates. Cladding and backing are inseparably bonded together. Claddings are available in thicknesses from 5% to 50% of total plate gage. AISI stainless specifications 304, 304L, 316, 316L, 316Cb, 321, 347, 405, 410, 430 are provided. ASTM A-263 and A-264 specifications can be supplied also.

CLAY-LOY high strength low alloy steel plates—comply with ASTM specification A-242. Ideal for structural and equipment applications where weight-saving is important.

CF&I LECTRO-CLAD nickel plated steel plates—give positive protection against product contamination and discoloration, at less cost than solid nickel.

Claymont Spun and Pressed Heads

Claymont has complete facilities to produce spun or pressed heads . . . in diameters from 9 inches to 19 feet . . . in gages from 3/16" to 6" . . . in the following shapes: standard or ASME flanged and dished, conical, hemispherical, elliptical, flanged and reverse dished, dished only, flared and dished, flanged and shallow dished, flanged only, and large segmented and welded shapes. Metals include carbon, alloy, stainless or stainless-clad steels; aluminum, aluminum alloy, brass, bronze, copper, Hastelloy, inconel, monel, and other ferrous and non-ferrous metals supplied by our customers.

Large stocks of the more popular sizes of Claymont Heads, flanged and dished in carbon steels, are maintained at the following CF&I warehouses:

Chicago • Claymont, Delaware • Houston • Los Angeles San Leandro, California • Tulsa

Claymont also manufactures a complete line of fittings for pressure vessels, such as manhole and handhole fittings, elliptical manhole rings and storage tank manhole frames and covers.

Claymont Fabricated Steel Plate Products

Claymont's production-line fabrications shop is completely equipped to convert the steel plate of your choice into completely-fabricated assemblies or simple, single-operation parts or components. Job-shop facilities of all kinds are available to furnish welded, rolled, sheared, flame-cut, pressed, punched or machined products to exacting specifications. Claymont's fabricated structural weldments range from 120-ton fully-welded sections to such items as bearing assemblies, base and tie plates, wedges, gussets and straps.

Use Claymont's complete plate fabrications facilities as an extension of your own shop. Have difficult, time-consuming operations performed *before* the steel plate is delivered, and save shipping and handling on the part of the plate that you can't use.

If you use any of the steel plate products listed above, or large diameter API Pipe, contact the nearest CF&I sales office.

Claymont Steel Products

THE COLORADO FUEL AND IRON CORPORATION

CF&I STEEL

In the West: **THE COLORADO FUEL AND IRON CORPORATION**—Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso Farmington (N. M.) • Ft. Worth • Houston • Kansas City • Lincoln • Los Angeles • Oakland • Odessa • Oklahoma City • Phoenix Portland (Ore.) • Pueblo • Salt Lake City • San Francisco • San Leandro • Seattle • Spokane • Tulsa • Wichita

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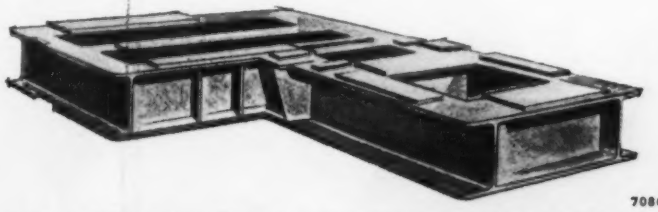


7086

Mill Odd Shapes i

...with Barber-Colman Form-Relieved Cutters

We don't expect you to have a job exactly like this . . .

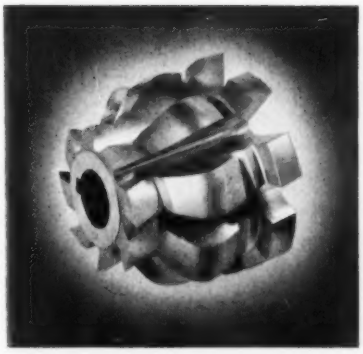
. . . but the manner in which cutter design was established may illustrate important benefits gained by submitting part prints to the Barber-Colman Tooling Service.

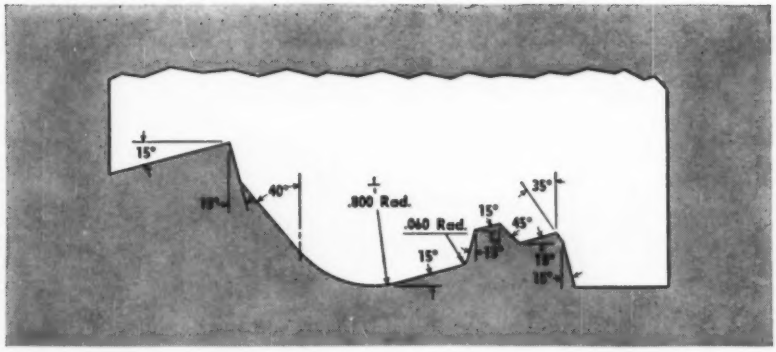
Whether you have irregular forms or a combination of straight surfaces to machine, a comprehensive engineering analysis will help you determine the one best cutter for increasing accuracy and combining operations economically.

Electronic computer aids cutter design

This cutter requires a 10° helix and a 10° positive radial rake to produce the accuracy and smooth finish on the part. The helical flutes and radial rake make it necessary to calculate the cutter tooth form which will produce the desired part form. All plot points, formerly obtained manually, were determined rapidly and accurately on a Bendix computer. Only the points where a change in form

in One Operation





occurs were obtained manually. Over 60 other points were determined quickly by the computer.

An electronic computer has the following advantages for you:

1. *Accurate cutters* — A direct solution is possible through the application of mathematical formulas which eliminate trial-and-error solutions. The great number of plot points which can be determined quickly and accurately assures exact duplication of complex shapes.

2. *Economical design* — You get the highest possible number of engineering man-hours devoted to actual development of the cutter because fewer hours are required to work out details.

3. *Faster service* — Speed of computation permits us to check a number of designs and still meet reasonable delivery schedules.

4. *Flexibility to change* — All variables other than form, such as helix angle, side clearance, number of teeth, cam, diameter, rake, etc., can be changed at any stage of engineering without rigidity at our end. There's no incentive to "save" a design should a different helix angle or diameter be desired.

Design of this cutter included a cutting clearance problem. If the part were set square with the cutter, a two-piece cutter with axial relief in both directions would be required. However, by tipping the part at 15°, a one-piece cutter can be used.

Let us analyze your milling operations

The Barber-Colman Tooling Service is the most complete milling cutter facility available under one roof. Your part drawing can be evaluated in terms of every cutter style, for which we have complete manufacturing facilities: (1) standard or special cutters, or a combination of these in a gang; (2) high-speed steel or carbide-tipped; (3) eccentric-relieved or profile-type; and (4) ground or unground form.

There is a lot of wisdom in rechecking operations periodically in terms of new tooling and methods. This is not a difficult or costly thing to do. Yet it may reveal golden opportunities to tighten up tolerances, improve surface finish, or reduce manufacturing costs. It may be on a time-consuming planer job, a series of flat-surface milling operations, complex form milling, or even new pieceparts.

How about putting the Barber-Colman Tooling Service to the test? It will cost nothing to submit part prints or discuss your jobs personally with a Tooling Specialist. We're ready any time you are. Call your nearest Barber-Colman field office or the factory — TR 7-5741.

Barber-Colman Company

BARBER COLMAN

710 Loomis Street, Rockford, Illinois

Republic's CENTURY 100 SERIES of

High Strength, Stress Relieved, Cold Finished Steel Bars

What Is The CENTURY SERIES? A family of five grades of cold finished, specially processed, stress relieved bars having a minimum yield strength of 100,000 psi. Available from Republic in C-1144, C-1141, C-1151, C-1050, C-1045.

Why a CENTURY SERIES? To meet the needs of steel parts producers requiring high strength with varying degrees of machinability. The CENTURY SERIES assures dimensional stability with excellent machinability, provides high mechanical properties in a range of chemistries.

Republic's overall policy has always been to suggest the least expensive grade of steel that will adequately meet the mechanical requirements of the application and the degree of machinability desired.

C-1144, for example, would be the proper choice for a part requiring high strength combined with maximum machinability. However, it may not be the best or most economical selection for parts on which machinability is not of prime importance.

Republic's CENTURY SERIES makes it possible to achieve considerable savings by selecting the grade best suited to a specific requirement. Where maximum machinability is not required a lower sulphur grade, such as C-1141 or C-1151, can be considered. If machinability is a minor factor, C-1050 or C-1045 may be considered. As sulphur decreases, toughness and resistance to shock increase. Therefore, it is frequently possible to obtain a better strength/toughness ratio at lower cost by using one of the lower sulphur steels as indicated on the chart.

GRADE	ANALYSIS EXTRA	BEST COMBINATION OF STRENGTH & TOUGHNESS	MACHINABILITY
C-1144	$1.35		
C-1141	1.10		
C-1151	.70		
C-1050 & C-1045	.15		

Which Grade Is Best For Your Production? Republic offers the services of expert metallurgists—field, mill, and laboratory—and machining specialists to work directly with your personnel in selection, application, and processing of the right grade for your particular application.

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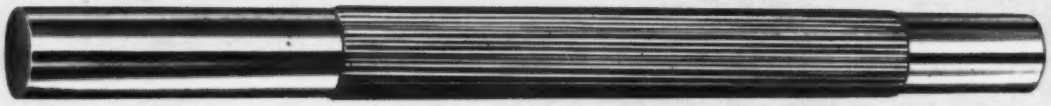
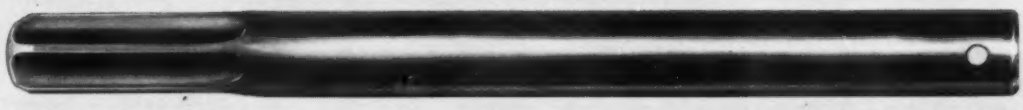
CENTURY SERIES C-1141 Hoist Support Shaft



CENTURY SERIES C-1151 Electric Motor Shaft

CENTURY SERIES C-1050 Axle



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BEARING BRIEFINGS

One in a series of technical reports by Bower

ROLLER GUIDANCE– VITAL FACTOR IN BEARING LIFE

Roller guidance has been established by the Anti-Friction Bearing Manufacturers Association as a major rating factor for roller bearings. There is a direct relationship between this factor and the life and capacity of a cylindrical roller bearing under load.

Figure 1 illustrates the results of a loose fit between a roller and the guiding ribs of the raceway. Because of lack of guidance by the ribs, the roller is free to skew and skid under load. Such a condition invariably leads to early bearing failure.

To achieve close roller fit and proper roller guidance, Bower precision grinds each bearing race on specially designed centerless grinders. In this operation, Bower positions the integral raceway ribs *from the theoretical centerline of the bearing*. This method produces bearings with high dimensional accuracy and perfect symmetry.

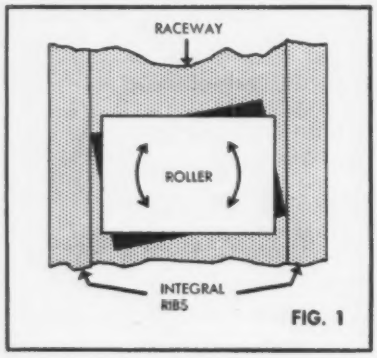
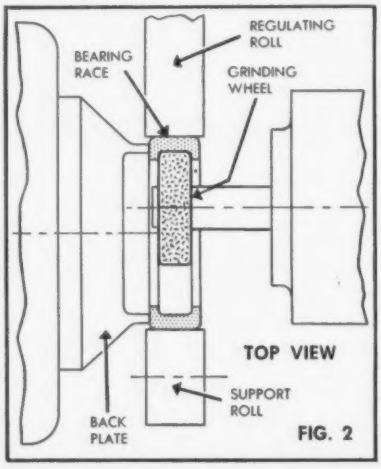
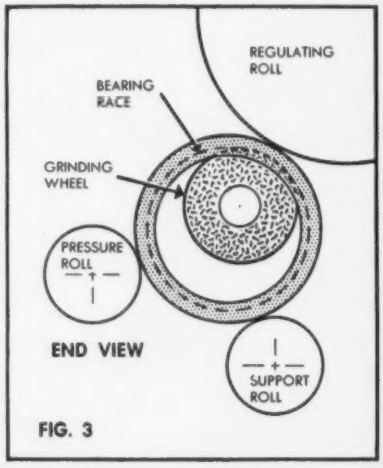


Fig. 1. Loose fit in raceway means poor roller guidance. Roller can skew and skid under load.

In addition, the close tolerances held in grinding the roller track and integral guiding ribs give Bower cylindrical roller bearings the ability to *take thrust in any direction*. A Bower cylindrical roller bearing has thrust capacity of from 10-15% of its rated radial capacity!



Figures 2 and 3 diagram the centerless grinding method used to finish Bower raceways. Use of this technique assures not only optimum roller guidance and maximum bearing life, but also virtually eliminates bearing runout. BEARING SYMMETRY WHICH RESULTS FROM THIS TECHNIQUE PERMITS ACCURATE SHAFT LOCATION REGARDLESS OF HOW THE OUTER RACE AND ROLLER ASSEMBLY ARE INSTALLED. IT COMPLETELY ELIMINATES THE POSSIBILITY OF IMPROPER INSTALLATION.



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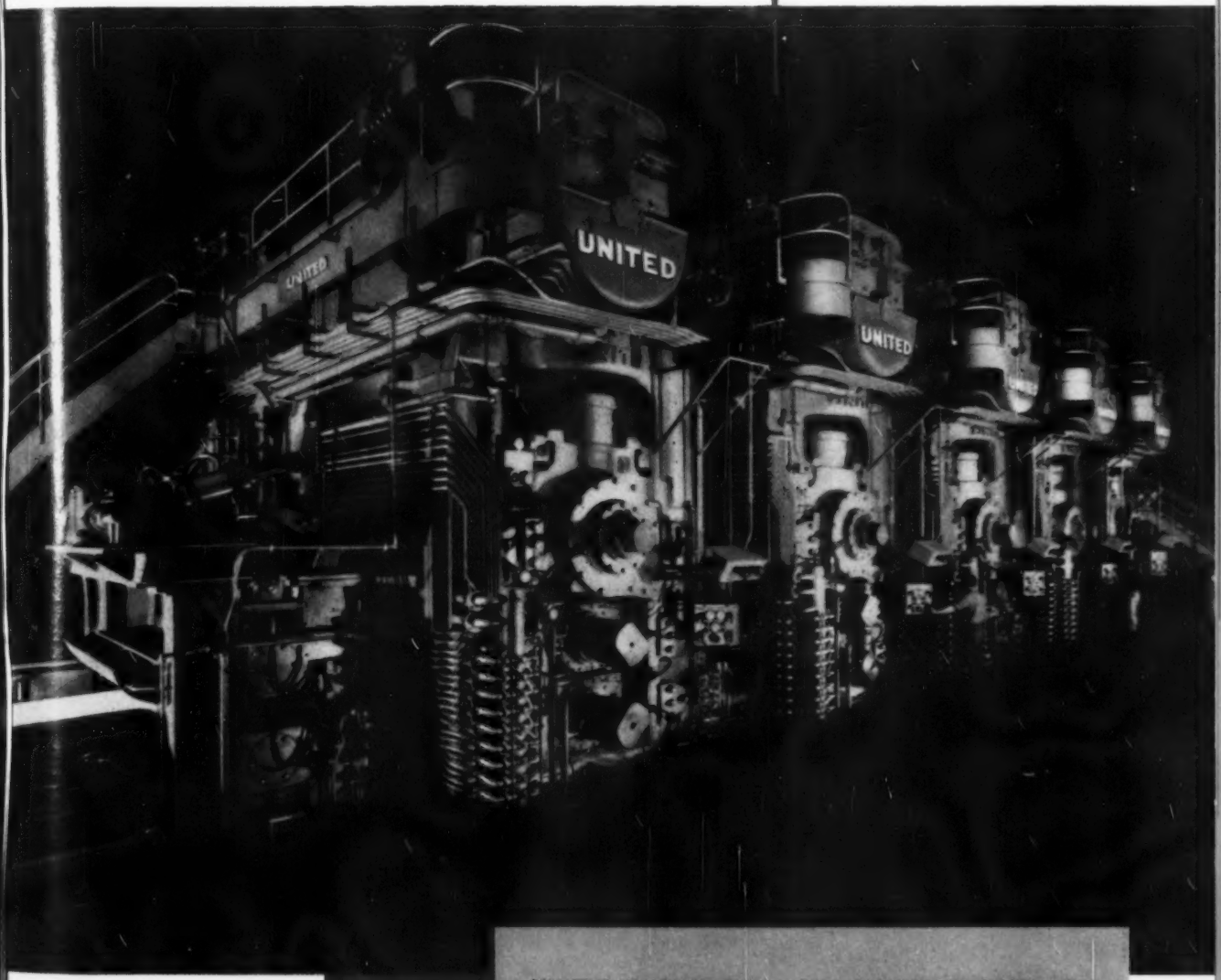

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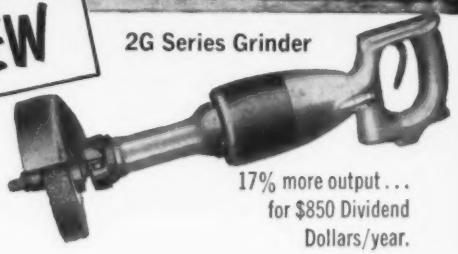

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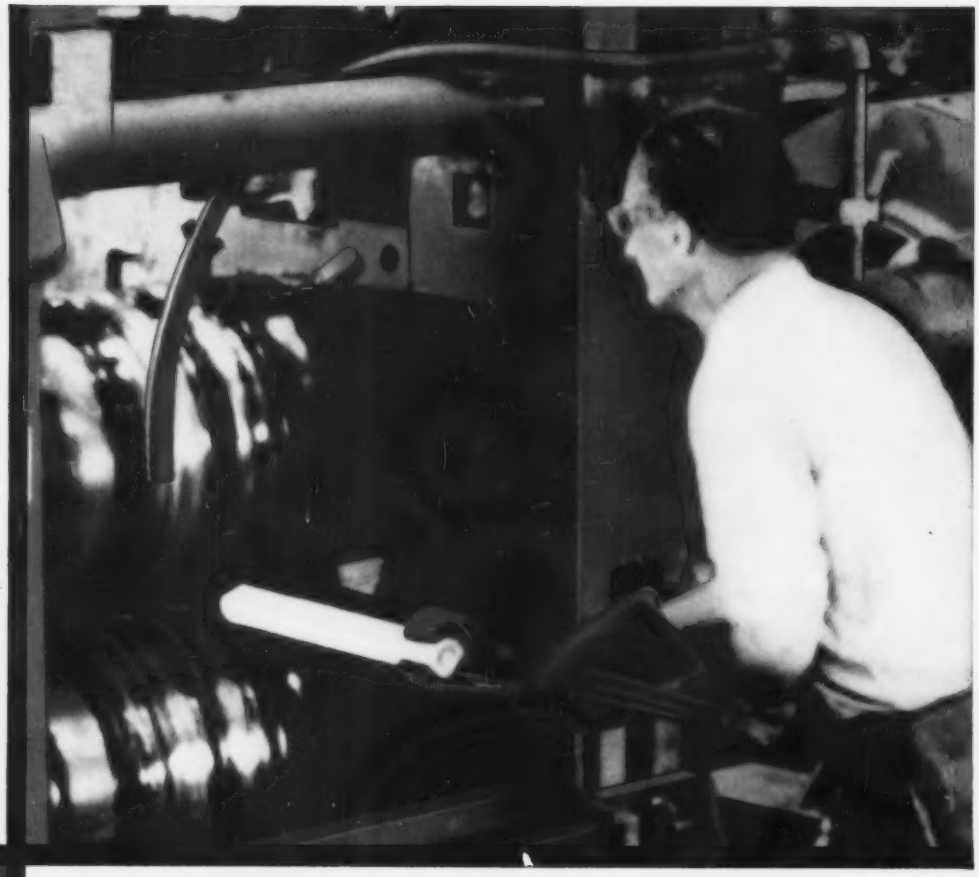

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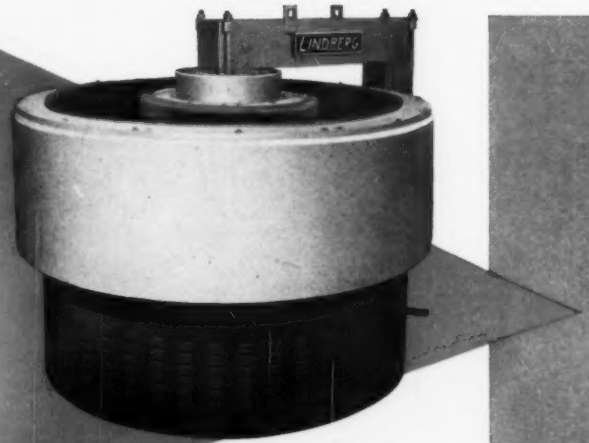
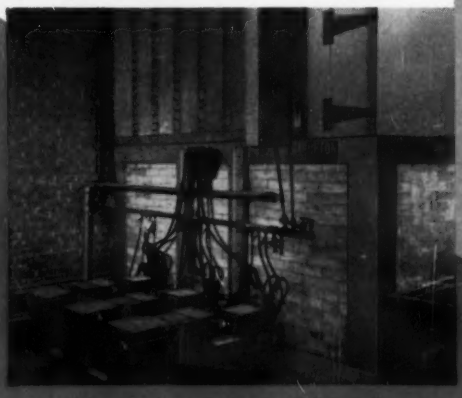


Lindberg Induct-O-Ring, first electric production salt bath furnace, that can be shut down overnight and regain operating temperature quickly. Rotary action provides positive quality control.



Upton aluminum dip brazing Salt Bath Furnace featuring Continuing Graphite Electrodes. Installation in plant manufacturing industrial heat exchangers. Note insulated chamber over salt bath.

This line of Upton Salt Bath Furnaces, in use in a commercial heat treating plant, handles all types of steel heat treating including high-speed steel tools and parts.

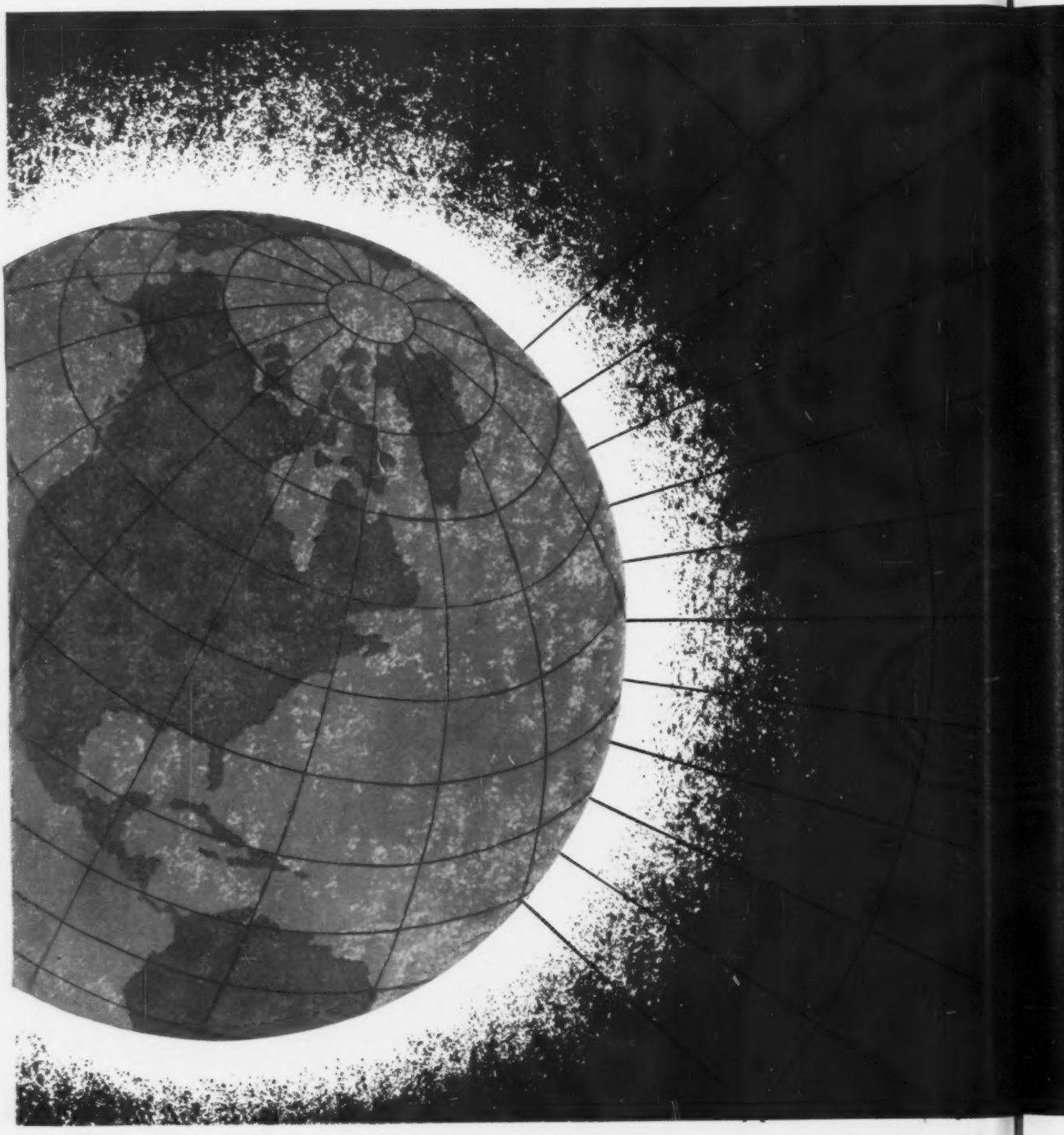
A complete line of high and low temperature salt bath furnaces for any production, pilot plant or laboratory use is now available from Lindberg. This line includes not only Lindberg equipment, but, by joint agreement, the complete line of Upton Salt Bath Furnaces, manufactured by Upton Electric Furnace Company, Roseville, Michigan.

This combination of Lindberg, with its long experience in all types of industrial heating equipment and Upton, leading specialists in salt bath furnaces, will provide industry with more efficient service in the important salt bath furnace field.

Lindberg and Upton engineers and technical staffs are available to assist you in applying salt bath furnace techniques most efficiently to your production processes. Just get in touch with your nearest Lindberg Field Representative (see your local classified phone book) or write us direct. Salt Bath Furnace Division, Lindberg Engineering Company, 2452 West Hubbard Street, Chicago 12, Illinois. Los Angeles plant: 11937 South Regentview Avenue, at Downey, California.

Upton deep submerged electrode Salt Bath Furnace. Available in depths and lengths up to 40 feet or more.

Continuing Graphite Electrodes, an exclusive Upton feature, eliminate bath contamination and provide exceptional savings in electrode costs over conventional, overhanging metal electrodes.



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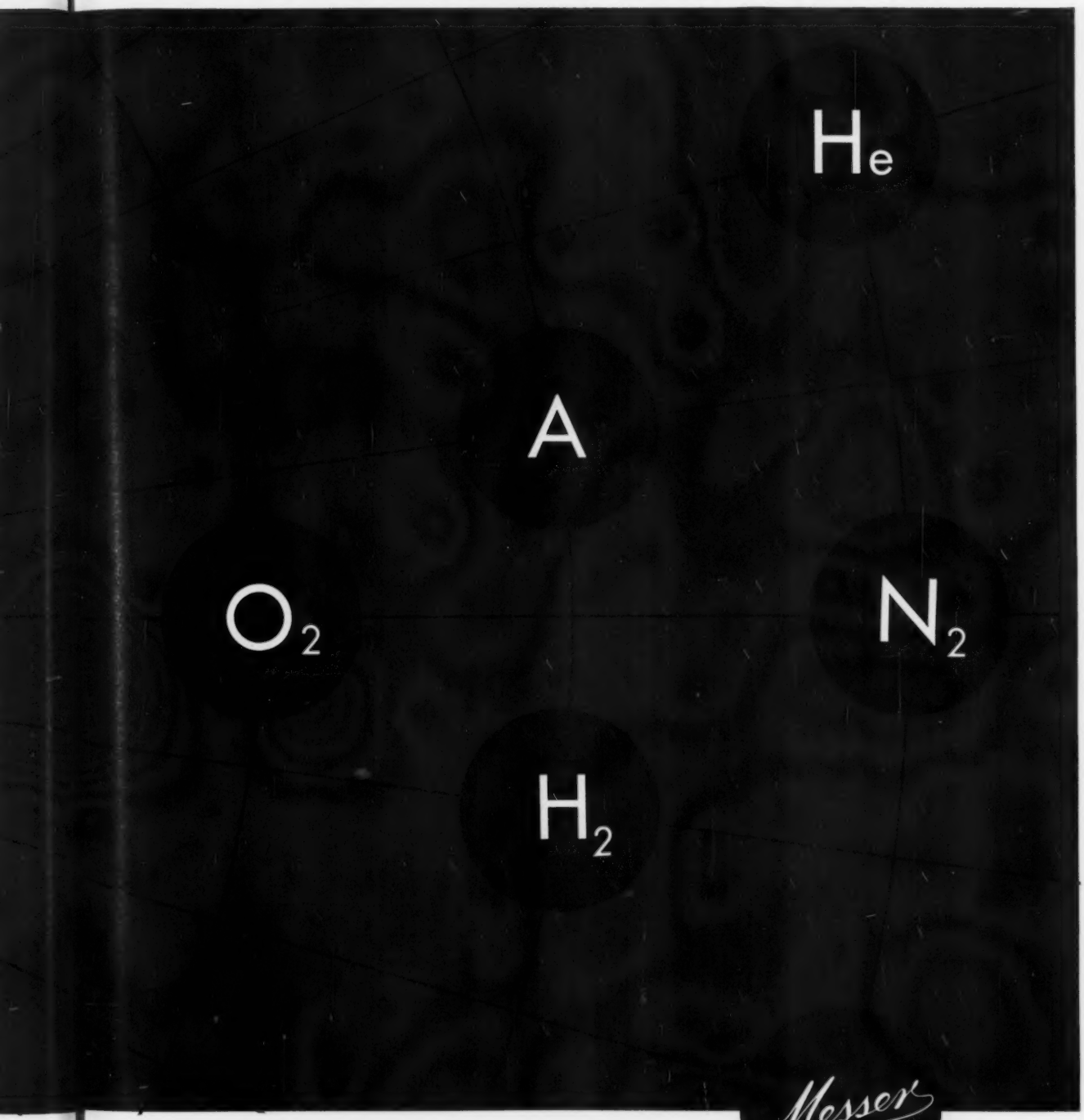

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YEH, YOU CAN ALWAYS TELL, CAUSE NEXT DAY HE'S GOT IT KICKED ALL OVER THE FLOOR.
OLD STOSH MUSTA BEEN OUT LATE AGAIN LAST NIGHT.
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FOREIGN STEEL COMPETITION with U. S. mills is likely to worsen, says Robert G. Welch, executive vice president of American Steel Warehouse Assn. But he adds: "I doubt if the percentage of this tonnage in relation to domestic production will show more than a moderate increase during the next ten years."

WELDING EQUIPMENT SALES will be at least 20 pct above those of 1958, say industry analysts. Arc weld equipment sales are expected to hit $75 million, resistance welding equipment, $25 million.

GOVERNMENT SUPPORT OF HOUSING isn't likely to falter. The housing bill vetoed by President Eisenhower will be passed again with enough provisions to keep essential government housing programs operating.

FIBER GLASS may be next major competitive material in $200 million tank truck market. Original cost is reported favorable in relation to steel and aluminum. But greater advantage is claimed in lower maintenance costs, versatility, and safety.

NEW TECHNIQUE for making ordnance shells may bypass the need for using specialty steels. Savings to government could run as high as $19 a ton.

CONSUMABLE ELECTRODE VACUUM MELTING of low alloy steels is paying off, says Allegheny Ludlum Steel Corp. Company reports it is getting good results. Formerly, the process was used to melt only exotic metals such as titanium, zirconium, and molybdenum.

DEFENSE SPENDING BUDGET of about $39.5 billion for the year ending next June 30 is now foreseen. This is the approximate amount House and Senate leaders are likely to agree on. It is slightly more than the $39.3 billion asked by the Administration.

INDUSTRIAL DIAMOND SALES reflect upturn in industrial activity. Sales were up 113 pct in second quarter over the same period of 1958, report spokesmen for African diamond mines.

STEEL SELLING MAY SHIFT from product to market lines. U.S. Steel is experimenting with this approach and finding it works. In building, for instance, a market approach offers all the various mill shapes and alloys in one competitively priced package.

ON THE BALL

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Because ball point pens are in everyday use, production of vital brass tips becomes astronomical along with quality control problems.

These tips – one of which is shown much enlarged – are produced at ultra-high speeds. The brass rod needed for them must be flawless in every respect. *Consistent* metallurgical composition, *precise* dimensional tolerances and *unvarying* standards of machinability – if any of these qualities vary even a fraction, production comes to a frequent and costly halt.

That's why Revere Metal Art Co., Inc., New York City, specifies Bridgeport Free-Machining Ball Point Pen Brass Rod for these inserts. It meets all requirements for precision, straightness, workability, machinability and tolerances –and, in addition, provides a surface finish that keeps finishing time and costs to a minimum.

Whether you use rod, strip or tube, you can count–just as Revere does–on getting consistent quality every time you specify Bridgeport Brass Alloys. It will pay you to get the complete story. Call your nearest Bridgeport Sales Office or write us direct for a complete list of Bridgeport products–Dept. 3407.

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Specialists in Metals from Aluminum to Zirconium

BUILDING: Charles S. LeCraw, Jr., (l.) formerly in the construction business, but now with U. S. Steel, discusses steel in curtain walls with K. C. Woodrow, metals manager, Limbach Co., Pittsburgh.

How "Marketing in Depth" Works For the Basic Metals

U. S. Steel tries selling markets instead of products.

Initial returns look so good this may be the trend for future steel distribution.

Aluminum is already doing it, and copper is peering in this direction.—By G. J. McManus.

▪ In the fourth quarter 1958, United States Steel Corp. landed orders for several hundred thousand dollars worth of flat-rolled stainless for a new building for Harris Trust Co., Chicago.

For U. S. Steel's marketing development team, headed by Robert C. Myers, it was the payoff on one of the first building product sales programs organized in depth along market lines. It may be the direction steel distribution will take in the future.

Steel won't be blazing the entire trail for metals. Aluminum selling grew up along market lines.

Aluminum Projects—For example, Reynolds Metals Co. became one of the biggest offset color printers in the country in the process of teaching packaging designers to work with aluminum foil.

The copper and brass industry, however, will be watching steel for pointers. Copper is just starting to lean in this direction. Says the head of one major brass mill, "A whole generation of architects has grown up without knowing the copper and brass story. We've got to remedy this."

The Harris Triumph — Here's how U. S. Steel's Harris project worked out:

By early 1957, Harris Trust had completed preliminaries and it was about time to decide exactly what type of building would be built. U. S. Steel's market development men began fanning out on the project.

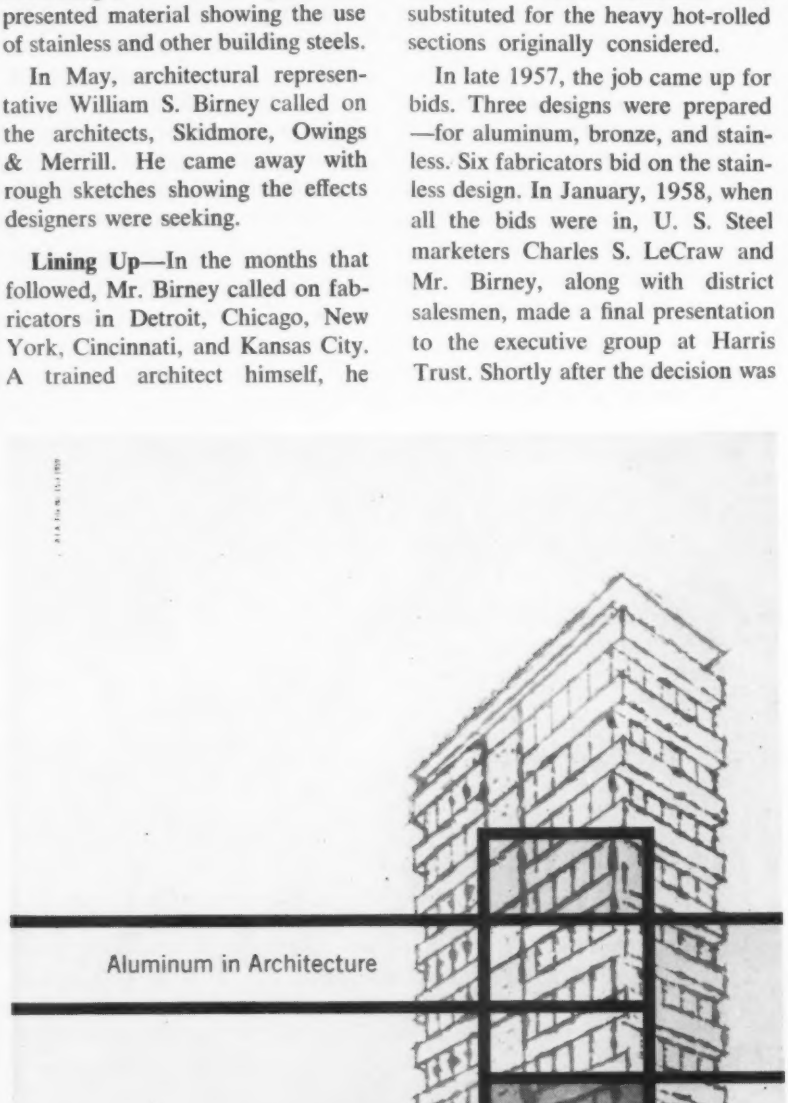
In March, a market development

man called on the construction vice president of Harris Trust. Along with a district salesman, he learned something of the owner's plans and presented material showing the use of stainless and other building steels.

In May, architectural representative William S. Birney called on the architects, Skidmore, Owings & Merrill. He came away with rough sketches showing the effects designers were seeking.

Lining Up—In the months that followed, Mr. Birney called on fabricators in Detroit, Chicago, New York, Cincinnati, and Kansas City. A trained architect himself, he worked with fabricators on the job of translating design concepts into economical stainless components. Cold-rolled sheet assemblies were substituted for the heavy hot-rolled sections originally considered.

In late 1957, the job came up for bids. Three designs were prepared —for aluminum, bronze, and stainless. Six fabricators bid on the stainless design. In January, 1958, when all the bids were in, U. S. Steel marketers Charles S. LeCraw and Mr. Birney, along with district salesmen, made a final presentation to the executive group at Harris Trust. Shortly after the decision was made for stainless.



ALUMINUM AND COPPER: Inside this booklet of Kaiser Aluminum's it says "What the architect conceives . . . aluminum achieves." Much of aluminum's building promotion has always been aimed at the architect. Now copper is doing this with some impressive projects being planned.

Marketing Targets — Apparently architects are one of the main targets of metalworking marketing in depth. Reynold Metals Co. puts up a $25,000 award each year for the architect who uses aluminum best. And the company has an Architect Service that will aid the building designer in any way possible.

Alcoa is constantly testing panels, both load bearing and curtain wall, at its New Kensington labs to offer the architect something new, complete with data. And Alcoa spent a large sum to publish Schoolhouse —a hard-covered book on school buildings that is both arty and practical—for parents, school boards, and architects.

Copper Looks Ahead—One copper company decided to put out a little manual for architects describing some copper and brass possibilities. During the project the management became so enthusiastic about the possibilities that the goal was magnified and the material polished up to where the final "books" cost close to $3 each to produce.

Now at U. S. Steel, everytime a construction job of more than $1 million is announced, marketers begin a bird-dogging action similar to the Harris Trust triumph.

Auto designers are also being "assisted." Last year the Corporation added an auto group to its market development staff. To head up its new unit U. S. Steel hired John M. Reinhart, a top stylist from Ford Motor Co.

Last month a group of General Motors designers visited U. S. Steel's research center at Monroeville, Pa. The auto men were told to consider it an extension of their own research labs.

Auto Market—Kaiser Aluminum & Chemical Co. has already designed and built scale models of ultra-modern cars making generous use of aluminum, for auto designers to ponder. And all aluminum com-

panies have large auto marketing staffs in Detroit.

Other, less publicized markets are getting plenty of assistance from metal producers. Example: Aluminium Ltd., Canadian aluminum producer, has been bashing test aluminum freight cars together for almost 11 years assembling design data.

U. S. Steel's marketing team is still being formed. Currently topping the wanted list: Experienced architects. The current lineup shows a staff of 11 for agricultural market development, nine for consumer products, four in general industrial, and another 11 spread over automotive, building and construction, highways, residential building.

Structure—The group formally operates under the vice president of marketing. In matters involving the actual movement and sale of steel it operates through line sales and distribution channels. The team has quadrupled in the last 10 years.

In its service functions, market development acts somewhat as a coordinating agent, pulling together research, advertising and other marketing problems and objectives.

One of the key factors in making a success of marketing in depth is finding men with the right skills.

Farm Selling—The Corporation figures the farm projects it has pioneered have helped put three million tons of galvanized into grain bins. They have helped sell roofing and siding for 150,000 loose handling barns for dairy cattle. And they have resulted in outlays of $500 million for stainless milk handling systems.

But F. J. Reynolds, who heads up the agricultural section of market development at U. S. Steel has been working in this field for 20 years. He is a part-time farmer and a former county agent. On his staff are 11 agricultural school graduates. Four of them are agronomists.

Most of these projects start as agricultural school tests, sponsored by U. S. Steel. After years of trial the school may give its approval. The marketers then seek cooperation from county agents and other farming authorities. Finally they reach out to the farmer himself.

In other specialized areas, U. S. Steel can call on such as aeronautical engineers, stylists and merchandising experts. Also, outside agencies and internal researchers may be called in.

Market developers can help tie together jobs that straddle different regions. They are useful in cutting across the product lines of steel distribution. A single move in the construction field may involve nine different product managers at U. S. Steel. The marketer can help produce a unified effort.

Wants a Package—Speaking on this point, building marketer Charles LeCraw says, "The construction industry is involved in contract selling rather than product selling." He explains the building buyer has no interest in a mill steel product. He is interested in a package that includes steel, design and fabrication, priced all together to meet competition.

Steel marketers talk wistfully of a time when their metal will travel outward along market rather than product lines. At the moment the market concept is applied primarily at staff levels. Three U. S. Steel district offices now have construction specialists as line salesmen. In practice, marketers come close to actual line sales.

In much of its marketing U. S. Steel, is selling for the whole industry. Because of its size, the Corporation can figure on a payoff that justifies this kind of selling.

How Much Customer Service?

Service Policy—On the question of services, U. S. Steel Corp. is moving cautiously. Its general industrial group expects to launch about 50 separate programs in 1960. These will include presentations to aircraft and missile designers; mailing pieces for cold-finishers; educational sessions for line salesmen; general advertising; technical data books and visual aids.

In addition, there is a service that may be called design counseling. Industrial marketer, George McPherson along with Harold Matson and T. L. Harp will discuss design problems and offer advice to makers of aircraft, transportation, mining and other types of equipment.

How far a basic producer should go in this type of assistance is a sticky question for U. S. Steel. Costs and customer relations make the Corporation hesitate to offer full design and development service. On the other hand steel faces highly developed technical assistance programs of aluminum in auto, architectural and other fields.

How Much Help—Market developers offer no clear answer to this squeeze. In the case of a new stainless window, U. S. Steel worked on a finished, detailed product design. Auto designers are being offered finished product samples.

For most part, however, U. S. Steel seems to be staying away from detailed design. The structures group at Monroeville recently came up with a basic design concept for offshore drilling rigs. Use of alloy steel (T-1) was suggested to reduce weight by 250 tons.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

Welding Equipment Sales Revive

Manufacturers Draw Orders from Many Sources

Some call conservative predictions welding equipment sales will be 20 pct above 1958 levels this year.

Reason: New markets, new business from old markets, and new equipment are all boosting sales.—By K. W. Bennett.

▪ Welding equipment makers are drawing orders from a variety of sources—some new, some old.

The result: Flourishing sales surpassing earlier predictions for this year. Originally a 10 pct sales gain over 1958 had been forecast. Now industry estimates call for at least a 20 pct sales gain. And some sources call this a conservative prediction.

For manufacturers the 20 pct gain would bring total sales of $75 million for arcweld equipment and $25.5 million for resistance welding equipment. (See chart).

What's Responsible?—Where is the business coming from? New markets, new business from old markets, new equipment, new weld techniques are all boosting sales.

One company estimates 20-30 pct of the 1959 sales dollar for welding equipment comes from markets that didn't exist 2-5 years ago.

Many manufacturers are building backlogs. Some complex welding equipment is being ordered for 1960 shipment.

Missile Age Jobs — In missile-making, for example, Linde recently developed a tape controlled welder for Convair which puts 2000 precision spot welds per hour on a contoured tail surface. Similar units are going to Aerojet General and Sperry.

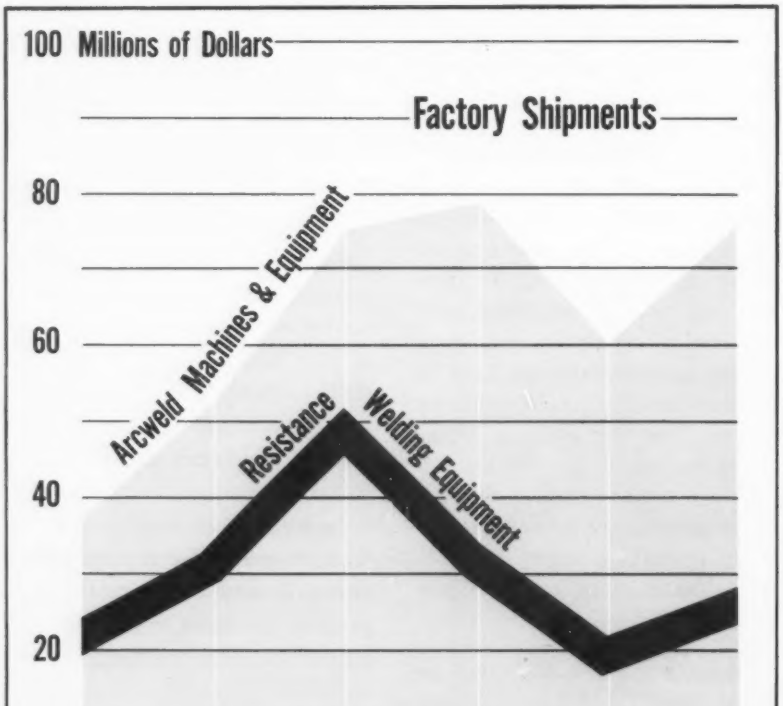
Welding of materials like inconel, titanium, stainless, hafnium and others is building demand for new equipment.

The welding of structural steel is a warming market. Welding can cut steel weight in a structure by 20 pct.

Best Sellers—Other sales sources: Stripped down, low cost welding units (500 amp range) for industry are a strong seller. Carbon dioxide welding is making a real sales breakthrough in 1959. Introduction of Clearing's all-welded lathe has opened machine tools as a wider weld equipment market. "Limited input" equipment for light farm and garage repairs is another good market.

Sold Ready to Use—Automatic production lines built around welding equipment are also pulling in buyer dollars. One resistance welding manufacturer points out, "Only 30 to 50 pct of the sales we make are actually for welding equipment. The rest of the dollar volume is in handling and forming equipment between welding stations. We're turning into a producer of packaged, automatic, production lines."

Welding Gear: A Good '59



What's Ahead in Steel Labor Relations?

Lesson Learned — The course taken by steel labor negotiations during the last two months points to tough times ahead for both the union and the companies after the settlement-to-come.

It may even be that some attempt will be made to take steel negotiations completly out of the spotlight. This could be done by adopting an approach such as that in coal labor, where John L. Lewis, coal union chief, sits down with an industry representative and works out the details. The auto labor negotiations have also been more secretive than the steel labor talks.

Too Much "Democracy"—One of the stumbling blocks to such an arrangement might be the great show of "democracy" that the United Steelworkers puts on. It has a 33-man International Executive Board and a 171-member Wage Policy Committee that supposedly speaks for the rank-and-file. The "power" of these two groups would have to be cut considerably before David J. McDonald, steel union president, could single-handedly arrive at a binding agreement with an opposite number from the steel industry.

One thing seems certain: The days of close harmony and human horsetrading in steel labor relations are gone for good. From here on out it is strictly business, with both sides applying the screws.

Why Steel Wage Talks Collapsed

Dispute over local working practices in the mills led to breakdown of negotiations.

Behind this was the steel companies' fight to hold down costs. —By Tom Campbell.

▪ An attempt to settle the steel labor dispute last week and early this week in order to avoid shutting down some steel units failed. Even the last-minute entrance of President Eisenhower did not halt shutdown preparations.

(For last-minute news on the crisis, see page 139.)

Trouble over the so-called local practices clauses was one of the holdup points. But there were a few other hurdles, too. At least some of the steel companies were adamant about getting as low a price tag on a wage boost as possible. This was because there was no chance of any steel price increase being put into effect.

Majority Decision — Late last week several steel firms were willing to put the labor problem behind them, but were outvoted by other companies. Just what the real inside exchange was among the 12 companies may never be known.

Union chief David J. McDonald was attempting to get as much as possible even though he knew that whatever he does get will be somewhat lower than any package deal since 1954, when there was a 5 cent boost with some fringe.

Call for Clarifiers—The weekend exchange of letters between Dave McDonald and R. Conrad Cooper, chief industry negotiator, had all the earmarks of a cloak-and-dagger drama. On the controversial 2-B clause (local practices), Mr. McDonald suggested as "clarifiers of language" Messrs. Benjamin F. Fairless, former U. S. Steel chairman; Clarence Randall, former chairman of Inland Steel, and Clinton S. Golden, former union vice president, and a retired Harvard University professor. The industry side promptly rejected this suggestion, arguing that it was unnecessary and that the whole problem could be resolved promptly by the union, without any "outside" help.

Coming Events—The last-minute hitch in negotiations will probably leave scars which will be a long time healing.

Whether the steel industry will ever again bind itself together in a 12-company group remains to be seen. It is believed that at least a few of the companies might think twice before they get into a situation like this again. It is true, however, that the basic weight of the decisions during the negotiations came from U. S. Steel, Bethlehem, and Republic.

1959 Union-Management Crises

How a U.S. Warehouseman Looks At Steel Import Problem

Robert G. Welch, executive vice president, American Steel Warehouse Assn., Inc., returned recently from a trip to Europe. While there, he addressed the 9th General Assembly of the International Federation of Associations of Merchants in Iron, Tubes and Metals, in Vienna.

Mr. Welch also studied European warehousing methods and talked with steel men from many European countries, and Japan. He came away with certain impressions about the problems faced by foreign steelmakers and about the growing competition of exports in the U. S. market.

This IRON AGE interview with Mr. Welch throws new light on an important aspect of the competitive export market.

Question: What is the feeling of foreign mills about exports of steel to the U. S.?

Answer: Responsible mills there are deeply concerned about disturbing distribution patterns within the United States. They are worried about their public relations in this country and are watching possible government controls. Many responsible mills have set up regular distribution patterns with their U. S. customers, like our domestic mills. But other mills sell anyone, including "quick buck" operators. Some U. S. mills do the same, of course.

Question: What is your association attempting to do about the steel import situation?

Answer: There has been entirely too much emotionalism connected with imports. Of course, it is hard not to be emotional when your pocket book is directly affected. We are trying to check out the facts on imports. We have appointed a five-member Foreign Steel Fact Finding Committee whose job it will be to make recommendations when all the facts are known. We hope to work out a sound program based on the information. We are attempting to find out what is coming in, where, who is handling it and quoted prices. Also, we want to get the views of the shipping mills, and study their normal export and domestic markets and merchandising techniques. We have also discussed pertinent Federal and State laws but basically feel the answer is not in Washington or local government regulations because it encourages controls.

Question: Foreign mills' pricing techniques seem to be inconsistent. Why is this?

Answer: Their pricing is not as simple as you might think. In countries like Belgium and Luxembourg, all but a small portion of the steel is shipped to other countries including the U. S. The mills are by far the biggest employers in the area. When their business slackens, they drop the price, even below their costs if necessary, and keep their mills operating at close to capacity rather than pay the relief bills for unemployed workers. In effect, the loss or low earnings of the Belgium and Luxembourg mills takes the place of

Service Center Executive Speaks up on Steel Imports

ROBERT WELCH: "There's been

. . . too much emotionalism, but it

. . . is not hard to be emotional when

unemployment compensation without government intervention. To make up such losses they raise prices as high as the traffic will bear during periods of high demand. During recessions in the U. S. we try to maintain relatively stable prices, cut back production, and pay laid-off workers unemployment compensation. There are, however, about as many different factors influencing price in foreign countries as there are countries.

Question: How do foreign mills sell in the U. S.?

Answer: Foreign distribution setups in this country are of three general types: (1) Direct mill sales offices in the U. S., (2) import firms with established quotas, and (3) take an order from anybody. The price fluctuations come in generally through the third type where opportunism gets involved. Steel then is sold almost like a perishable commodity. A load of steel coming over some times will change hands two or three times while still on the boat. If the market is cold at the time of arrival, it will lay on the dock and the price declines daily. The dealer may take in partners to spread his risk. Sometimes such material will end up sold below cost. In such cases price fluctuations in this country frequently are wider than the foreign mills' regular export price. It is this type of distribution which is of great concern to responsible mills abroad as well as to our own distribution channels. The customer suffers in the long run as well because he does not have a reliable supplier and gets "gouged" in times of shortage.

. . . your pocket book is affected."

Question: We understand as many as 20 new importers have appeared in Chicago in the last few months to handle imported steel. Do you know if this is true?

Answer: It is entirely possible although extremely difficult to pin down. In 1958, at least 30 importers sprung up in the Houston area alone. I understand that in the last few months, one importer alone has brought in 140,000 tons of plate and structurals, most of which has been sold.

Question: Are your warehouse members handling foreign imports?

Answer: Some are handling it, especially in the Gulf port areas, New York, and other coastal ports. Responsible firms identify the material and handle quality steels.

Question: Don't U. S. customers feel imported steel is generally low quality and resort to it only unwillingly?

Answer: In the past this may have been true. There are many mills in Europe and Japan that ship high quality specification material. There are also some products shipped by marginal mills where quality is low. The main difficulty the foreign mills have to face is slow delivery and communications. Therefore they feel they must sell at a lower price. The delivery performance of some is erratic but others have been a reliable source, although their price fluctuates widely. In some regions, especially in fringe areas for domestic mills, the reliability of foreign mills as a steady supplier has been every bit as good, or better than some domestic mills.

Question: What products are coming in heavily now?

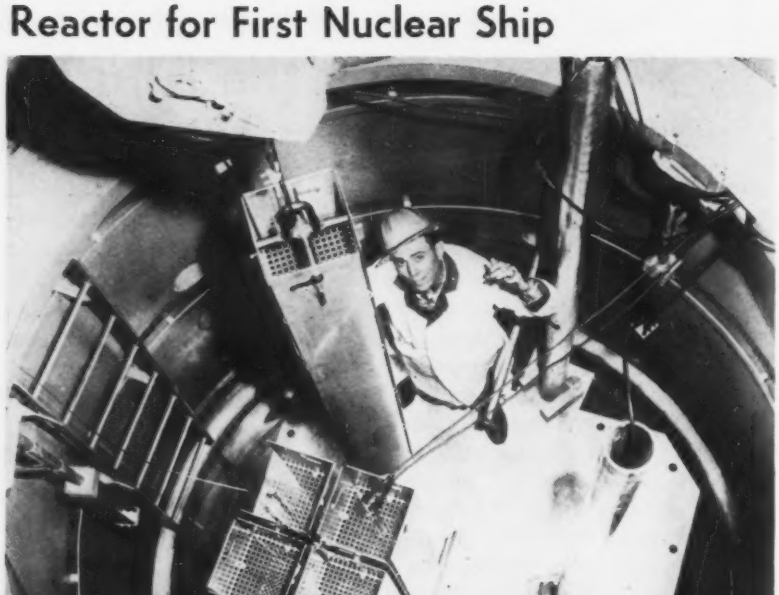
Answer: So far, the major imports have been re-bars, light structurals, oil country goods, pipe, wire rods, wire, and wire products such as fencing, nails, and staples. There has been little specification material.

What About the Future?

Question: What can we expect in the future in the way of steel imports and exports?

Answer: Our export market is rapidly drying up because of labor rate differentials. I think in the not too distant future we will be shipping only large diameter rounds, high nickel stainless, extra wide sheet and other specialty items unless some special government action is taken to permit domestic mills to compete. I believe there is no big flood of millions of tons of imports heading this way but I think we will have to live with the situation as it materializes. Their costs are lower than ours so they will be able to ship at lower prices but all products will not come over here at least for a few years. For example, although they are expanding their cold rolled sheet facilities, their consumer products market is growing so fast it will eat up all the sheets they can make for years. As new mills come in, particularly plate and structurals, we may see additional steel come over here until their domestic market catches up. A limiting factor is the shortage of financing to build capacity for the express purpose of penetrating U. S. markets. They have a struggle to finance current expansion plans. We will have to learn to live with a steadily increasing tonnage of foreign steel but I doubt if the percentage of this tonnage in relation to domestic production will show more than a moderate increase during the next ten years.

Reactor for First Nuclear Ship



IT'S ALL STAINLESS STEEL: This atomic reactor will be aboard the N.S. Savannah when she is launched July 21 at New York Shipbuilding Corp., Camden, N. J. Almost every item visible is of stainless steel.

Acme Starts Up New Oxygen Converters

Acme Steel's $33 million worth of new plant is swinging into commercial operation this week.

Two 50-ton-per-hr cupolas and two-ton-per-min oxygen converters give the Chicago stripmaker a 450,000 ton annual capacity. The twin converters, when at full operation, will be supplied oxygen by a 110-ton-per-day oxygen plant built by Air Products, Inc.

Charging Details—Each converter will produce 40 tons of liquid steel every 40-50 minutes. The converters are 14 ft in diam and 25 ft high. The charge is 20 pct scrap and 80 pct molten iron from the cupolas.

The cupolas are 10 ft in diam and 67 ft high. The cupola charge consists of 78 pct scrap and pig, 16 pct fuel coke, 5 pct limestone, and a 1 pct fluorspar addition to keep slag fluidity high.

Cost Advantage — Acme's decision to install converters has been followed with interest by the steel industry. Students of steelmaking costs point out that use of a converter-cupola combination to supply hot metal will reduce initial capital investment over more conventional hot metal sources.

Land Law Battle

The Interior Dept. will keep a veto power over federal land leasing, with a strong mandate from Congress to make certain no mineral rights are lost, if a House Government Operations Committee has its way.

The committee has approved legislation which would replace a government reorganization plan submitted by President Eisenhower. The plan, rejected by the House, would have turned over to the Agriculture Dept. sole authority to transfer forest and mineral lands. Under the present system, the two agencies share responsibility.

The replacement legislation, however, specifically directs the Interior Dept. to keep an advisory hand in federal land sales. It has to determine whether there are valuable minerals on any land the Agriculture Dept. proposes to transfer; decide whether the government should reserve these mineral rights when it finds them, and set a value on any mineral rights it finds.

Engine Block Patent

A patent for a die cast eight-cylinder aluminum automobile engine block has been granted to Alfred F. Bauer, ass't general manager and chief engineer of Doehler-Jarvis Div., National Lead Co.

The patent has been assigned to National Lead.

The design covered by the patent is applicable to all V-8 engine blocks, the company says. It eliminates undercuts, projections, blind passages, and allows for efficient mass production of engine blocks by die casting.

Housing Outlook

Government support for the home construction industry isn't likely to falter. The catch-all housing bill vetoed by President Eisenhower will be passed again with enough provisions to keep essential government housing programs operating.

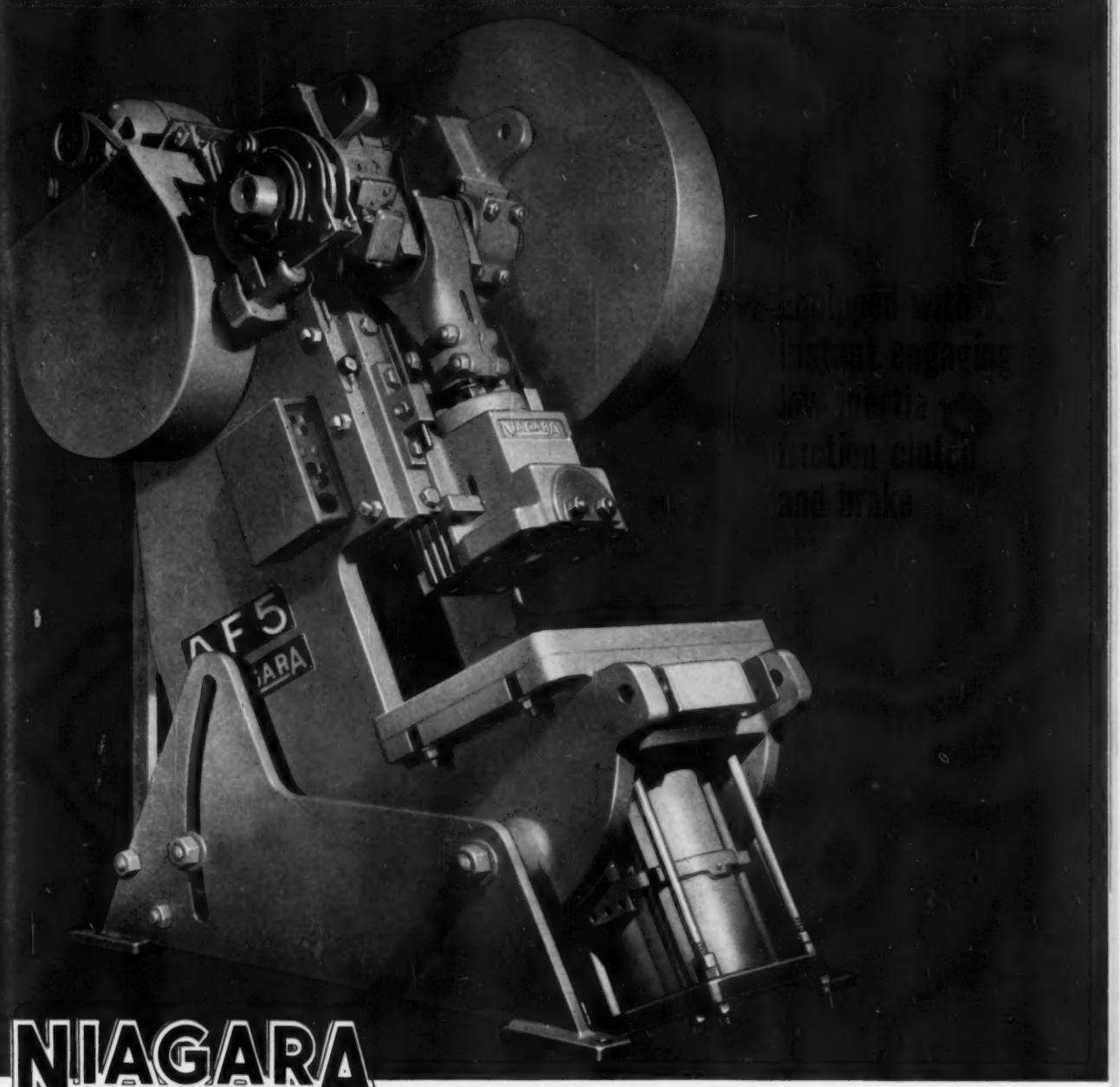
These include more authority for the Federal Housing Authority to insure home mortgages; lower down payments on some FHA-insured homes.

More Defense Funds

Money for military spending is going to exceed the $39.3 billion in new funds which the Eisenhower Administration seeks from Congress.

A national defense budget containing about $39.5 billion in new money for the year ending next June 30 now is foreseen.

A GREAT NEW LINE* JOINS NIAGARA'S BIG OBI FAMILY



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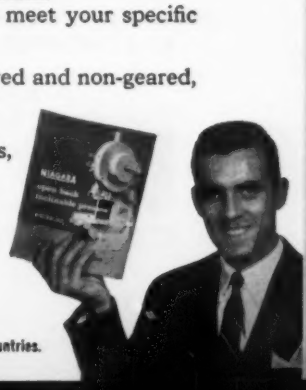

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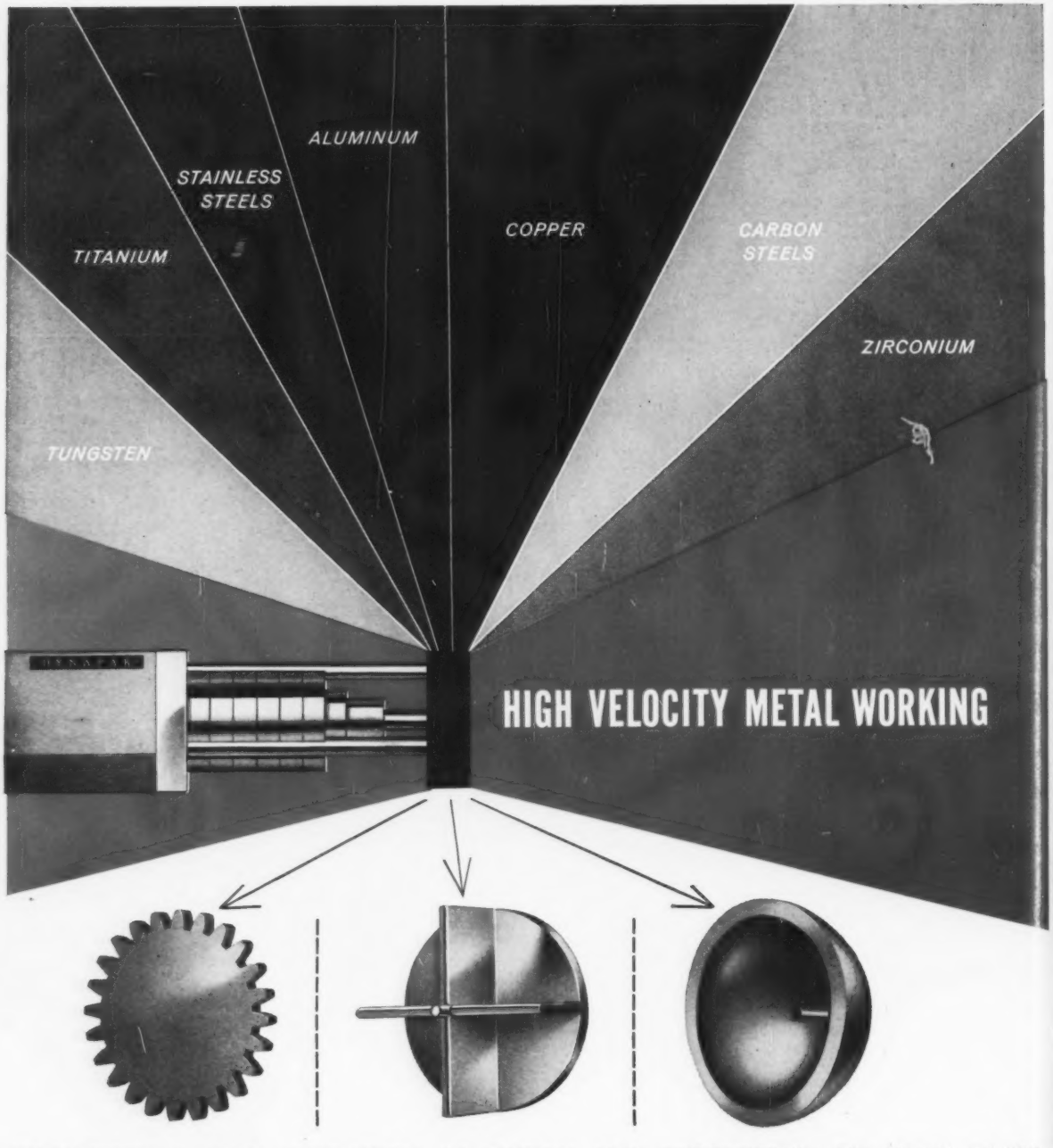

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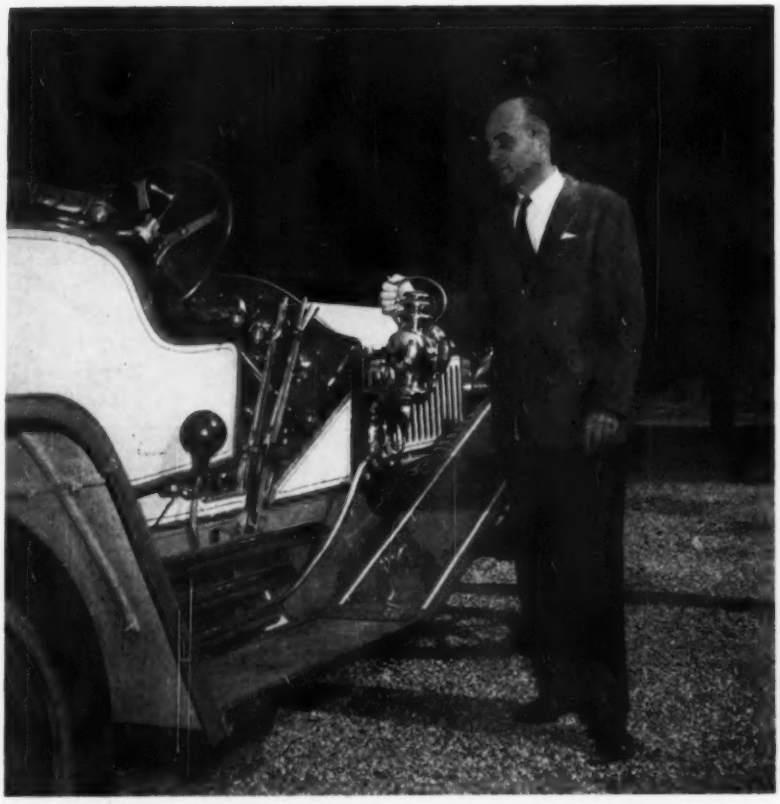


RICHARD M. STEWART: Stress is on research and basic selling.

▪ The 1911 Peerless that Richard M. Stewart, president of American Brass Co., drives to work contains about 350 lb of copper and brass. A 1959 car averages 50 lb.

From the day he took over at American Brass in April, 1958, Mr. Stewart's aim has been to bring back "the good old days" for copper and brass mill products. But his approach has been strictly modern.

A Sense of Direction—"Each of our department heads is a leader in his own field," he explains. "What we are trying to do is keep the vice presidents of sales, research, and manufacturing in close contact with each other so that the whole team moves in the same direction."

Anyone who knows the brass mill industry in Waterbury, Conn., might suspect it's not that simple.

Diplomacy Needed—For decades the mills have dominated the economy of the area. The three largest firms each trace their history back for more than a century. There has been a reluctance to recognize the growth of many new materials that seek to replace traditional brass.

Stressing the importance of a "new look" at the brass mills' problems has undoubtedly required a certain amount of diplomacy on the part of Mr. Stewart. His previous experience as head of industrial relations for the parent Anaconda Co. probably helped.

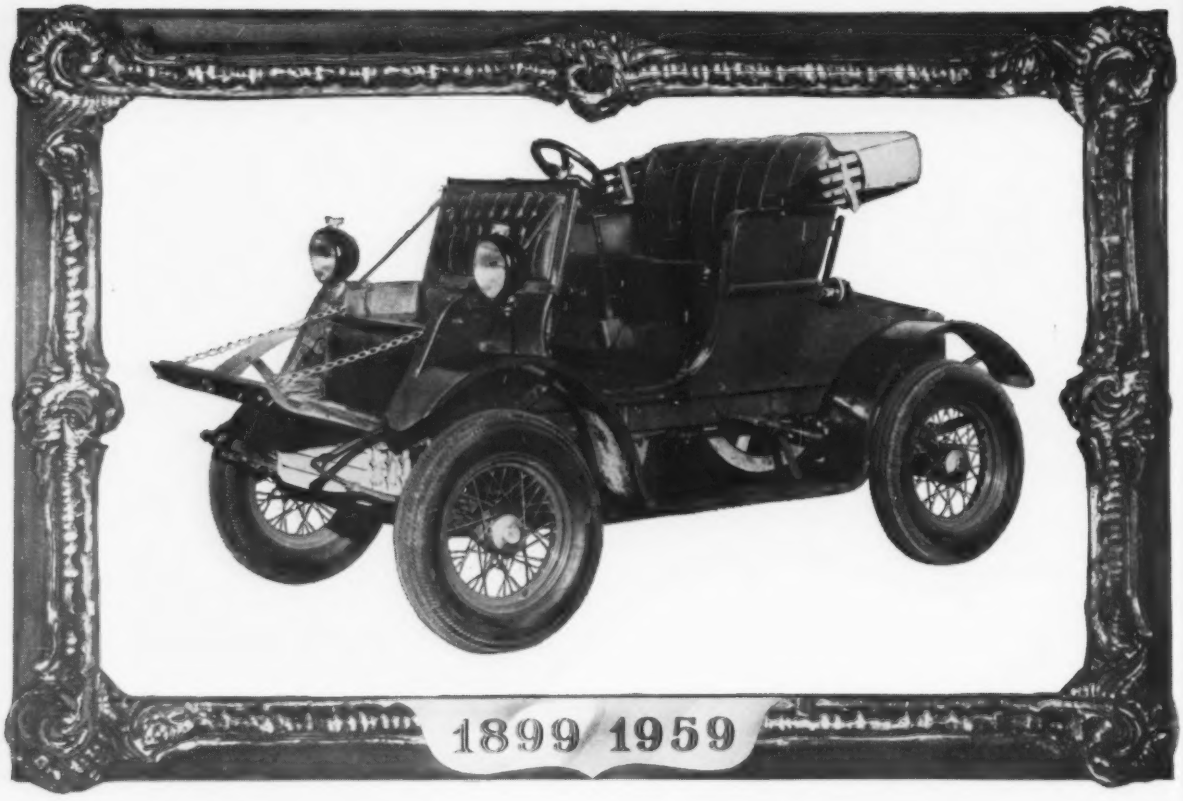
Major Drive Begins—Mr. Stewart has set in motion at American Brass a drive for new markets. It's likely to evolve into the major goal for the entire industry. Toward this end he is pushing research and basic selling.

Two traditional worries of brass mill executives—imports and competitive materials—apparently do not worry Mr. Stewart. "Imports push us closer to our customers and make us offer better service, and that is good," he explains.

As for other materials, "In the design of a product, brass is usually the first used. Other materials come in later as makers try to cut costs. Our job should be easier because we are only trying to stay in."

Getting Started—Born in Buffalo, the son of a college professor, Mr. Stewart got his engineering degree at Massachusetts Institute of Technology in 1932. His first business venture, engineering a toaster that could retail for a dime during the depression, flopped.

When an opening developed at Anaconda Wire & Cable that required legal knowledge, he took a cram course from the now famous Judge Harold Medina. He passed the New York Bar exams and got the Anaconda job. Later, he was promoted to counsel and then to director of industrial relations.



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Are Inventories Near the Top?

A big question that has to be answered soon: How much space is left before buildup stops and inventories level off.

Manufacturers' stocks jumped $400 million in May. But stocks are below pre-recession peak.

▪ Up to now, no one has worried about inventory accumulation. With the steel situation uncertain at best, stocks of materials, parts, and even unsold finished products have been considered money in the bank.

At the same time, business has been so good that inventory buildup has not been rapid or excessive. When related to rate of sales, stocks are not considered high and many manufacturers intend to continue the buildup.

Buildup Pace—But inventory accumulation has been going on for about nine months. In May, last month to be reported, manufacturing inventories rose $400-million. Dept. of Commerce figures show that three-fourths of the gain is held by durable goods makers.

This gain was brought about by buildups among machinery and transportation equipment makers. The buildup here is more significant in that it far overshadowed depletion of stocks held by primary metal producers.

How Much Steel—Steel inventories at the end of May were around 20 to 22 million ingot tons. This is something like two months of production and, by one way or another, it will have to be whittled down in the next few months.

Nevertheless, steel stocks alone are not considered a threat to business. The general feeling is that they can be adjusted without putting a damper on the broad business picture.

Time for Change?—But, reverting to overall business, the inventory buildup time is running out. When it comes, it will mean something like the $400 million a month buildup business will be withdrawn, even if stocks remain at high levels.

And this refers to manufacturers' inventories only, not retail or wholesale. It is estimated that in April all businesses added about $900 million to their stocks.

The question now is how much will be added to inventories before the buildup is complete and philosophy shifts to holding the line or to moderate cutbacks.

Some sources believe there is still a lot of space left before this point is reached. Stocks are some $4 billion below the pre-recession peak.

Quit Rate Reflects Optimism

▪ It's a truism that when business picks up, the rate of quits among employees mounts.

It's not hard to figure out why. Many are actively recruited by expanding companies. Many leave to take more desirable jobs as they open up. Others just quit with confidence that they can get another job with no problem.

Quit Rate—Last month the quit rate jumped to 13 per 1000 jobs. This is a figure that compares with boomtime rates, although some months in 1956 went well over 20 per 1000.

But last May, when the recession was crawling along on the bottom, the quit rate was only 8 per 1000 jobs as workers were only too happy to hold their employment.

Broad Advances — Overall, the employment picture is on firm ground. Dept. of Labor figures indicate that the factory hiring rate in May was the highest for the month since 1955 and the layoff rate was equal to the lowest for the month since the end of World War II.

Generally, May labor turnover rates were moderately improved from April. More dramatic are year-age comparisons.

Compared with last May, hiring rates have climbed by 5 and layoffs declined by 14 per 1000. In May of 1958, separations exceeded hirings by 6 per 1000. Last month, hirings exceeded separations by 8 per 1000.

Railroads Expect Big 3rd Quarter

Railroads expect third quarter business to be 8.5 pct better than a year ago. This is based on the national forecast of the Regional Shippers Advisory Boards.

Carloadings for the period are expected to total 6.8 million. This compares with about 6.3 million in the third quarter last year.

These are some of the gains expected, listed by commodity: Ore and concentrates, up 32.3 pct; iron and steel, up 9.4 pct; other metals, up 7.9 pct; machinery and boilers, up 3.8 pct; agricultural implements, up 5.9 pct.

One of the few declines is in automobiles, down 3 pct.

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HEADLIGHT CHECK: Test cars at General Electric's Miniature Lamp Dept. carry a bank of lamps to check headlight performance under road conditions and to help solve design problems.

Industry Adopts New Headlamp

With conventional units, lamp makers may have gone about as far as they can go.

But dual headlight systems are not involved in the changeover. —By H. R. Neal.

▪ Improved night driving visibility, and consequently safety, is in prospect for the 90 pct of auto owners who still have automobiles with only two headlights. A new 7-in. headlamp unit has been adopted by lamp and vehicle manufacturers that provides the same low-beam illumination characteristics as the dual headlight systems.

Known as the 7-in. Type Two headlamp, it is an advanced version of the Improved Sealed Beam unit introduced in 1955, which was the first major improvement in the headlight since the sealed beam headlamp was introduced in 1939.

Fifty Feet More Light — The Type-Two lamps illuminate an additional 50 ft of roadway ahead of the vehicle compared with older single lamp units now in use. The 1955 models in turn provided a 50 ft improvement over the original sealed beam lights.

According to The Automobile Manufacturers Assn., 75 pct or more of night driving is done with headlamps on low beam. "With use of the high beam on the highway limited by increasing traffic volumes, improved visibility provided by the low beam will make nighttime driving both easier and safer," AMA officials stated.

No Changeover Problem — As well as providing greater seeing distance on the low beam, the new headlamp offers better light distribution, improved illumination of the right side of the roadway and deeper penetration of fog and rain.

They are intended for both replacement and original equipment use. They have the same wattage as present single units—40 watts for low beam and 50 watts for high—and are completely interchangeable, both physically and electrically, with the older types of 7-in. sealed beam units.

High Beam On—Changes have also been made in characteristics of the high beam as well. High beams have a greater upward dispersion of light. This provides better illumination of the increasing number of overhead signs. In rolling country a greater area of a hill is also illuminated.

Despite the improved characteristics of the new headlamps, they aren't expected to replace the dual lamp system now used for most U. S. built new cars. For one reason, the high beam still isn't as efficient as that of the dual system.

Another, although minor reason: Safety officials like the dual headlamp system. It makes it easier to spot those annoying motorists who insist on driving with their brights on in heavy traffics, one AMA man explains.

Reached the Limit?—With the latest improvements offered by the new headlamps, no one seems sure what, if any, further improvements can be made in present types of headlamps. Increased illumination

for safer driving must be compromised to avoid the increased danger caused by glare.

But this doesn't mean that improvements won't be made in the future. For one thing, lamp and vehicle manufacturers, in cooperation with the American Assn. of Motor Vehicle Administrators, are exploring a number of approaches to the problem of headlight illumination.

Things to Come—Polaroid light is one possibility for the future, as in use of infrared light. And still another possibility is the use of fluorescent lighting. The latter has been used by General Motors in its latest gas turbine powered experimental car. Firebird III.

Auto Sales Set New Records

In Detroit last week it became obvious that the year of the drought was over. Reports of record auto sales blossomed like roses on a bush.

The trade publication Wards Automotive Reports said new car sales totaled more than 580,000 in June, highest since September, 1955. In June of last year the industry sold about 357,000 units.

First Half Total—Ward's said all new car sales in the first six months of this year totaled 2,936,100 units, 33 pct more than in the same 1958 period. The total, including sales of 300,000 imported cars, is the best since 1955.

At the same time, individual companies reported high or record sales. Cadillac general manager James M. Roche said domestic retail deliveries for the first six months totaled 77,134 units. This was an all-time high in the 57-year history of Cadillac and broke the former record set in 1957 when 76,459 deliveries were made. June sale of 11,721 were 14 pct ahead of the year ago month.

Other Records Fall—Chevrolet claims June sales set an all-time monthly high for passenger car sales for any one make. The new record: 175,263 units. The old record; 170,322 units; set by Chevy in June 1955. In the first half of this year Chevy has sold 810,540 passenger cars.

Rambler sales set another record for American Motors with the company reporting delivery of 43,556 cars last month and a total of 190,-091 for the first six months of the year.

Pontiac Doing Well — Pontiac said the 37,387 new cars sold in June represents a 93 pct increase over the 19,367 units sold in the year ago month. At the same time, it raised the first-half total to 212,-147, 74 pct over 1958.

Automotive Production

WEEK ENDING	CARS	TRUCKS
July 11, 1959	124,806	25,450
July 4, 1959	108,397	35,273
July 12,1958	73,062	15,036
July 5, 1958	35,273	7,742
TO DATE 1959	3,469,534	695,617
TO DATE 1958	2,341,777	466,849

*Preliminary Source: Ward's Reports

Rambler Wins Run

Two 1959 Rambler Six four-door sedans recently posted new coast-to-coast economy records for U. S.-built cars in a sanctioned cross-country run.

A Rambler Six with overdrive averaged 36.88 miles per gallon and the one equipped with an automatic transmission averaged 32.07 miles per gallon on the 3102 mile trip from Los Angeles to New York. The run was sanctioned and supervised by the National Assn. Stock Car Automotive Research.

Used Car Warranty

Ford Div. has announced the auto industry's "first universal warranty" for used cars. Henceforth, all Ford dealers will provide used car purchasers with a written warranty signed by both the dealer and customer.

Under the terms of a "performance protection policy," Ford dealers warrant each "A-1" used vehicle for 30 days or 1000 miles.

The Bull of the Woods

HEY, YOU GUYS-- HELP! CAN'T YOU SEE I'M CAUGHT IN THIS MACHINE? SHUT TH' MACHINE OFF--DON'T STAND THERE LIKE MULLET HEADS!
WHAT'S HE MEAN BY MULLET HEADS? WHAT'S A MULLET ?
I'VE HEARD OF MULLETS SOME PLACE! LET'S SEE-- MULLET-- MULLET-- MULLET--
SAY UNCLE!

P-K Internal-Fin Coolers can be furnished insulated with Rock Cork laid in asphalt and covered with a heavy steel jacket. Illustration shows insulated cooler.

Revere helps fit the metal to the job

AND PATTERSON-KELLEY CUSTOMERS SAVE 3 WAYS

Because of its unique design, the Patterson-Kelley Freon Water Cooler shown at right above saves space, requires less Freon, while its reduced weight and size mean lower cost.

With the P-K Type FO Internal-Fin Freon 22 Water Cooler the installation can be designed for a shell 2 diameters less and 1 to 2 feet shorter than with conventional plain or bare tube coolers. This is made possible by the use of ¾" O.D. x .035" gauge Revere copper tube drawn over a Revere aluminum extruded fin as shown above. Serrated surface of the fin enhances refrigerant vaporization.

By making both the tube and the extruded fin, and assembling them in the same plant a tight contact between the two metals is assured, thus establishing maximum heat transfer. Once again Revere has helped fit the metal to the job, money was saved and a more efficient product produced.

Why not consult with Revere's Technical Advisory Service and take advantage of its extensive knowledge in "fitting the metal to the job." This Service has saved others money, why not you?

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Founded by Paul Revere in 1801
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Mills: Rome, N.Y.; Baltimore, Md.; Chicago, Clinton and Joliet, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Brooklyn, N.Y.; Newport, Ark.; Ft. Calhoun, Neb. Sales Offices in Principal Cities. Distributors Everywhere.

AMERICAN ORIGINALS IN IRON AND STEEL

The process that was born by accident

Pondering the possibilities of cold rolling one day back in 1860, Bernard Lauth* was observing a millworker snake hot iron bars between swift-turning rolls. Suddenly the worker's tongs were yanked from his hands and pulled through the rumbling mill.

Later on, as the story goes, Lauth recovered the flattened implement and was fascinated by the high luster given to the metal. In later experiments, he discovered that by cold rolling iron bars he achieved greatly improved accuracy, appearance and physical characteristics, including strength.

Thus, it was partly by accident that the cold-rolled process was born . . . the process that today is being so successfully applied to modern steels.

Baker's MAGDOLITE, likewise, was an important early discovery in the annals of iron and steel. And, year by year, continued research has improved this product. Today MAGDOLITE helps you to obtain more ingots and better furnace efficiency at lower refractory cost. Users tell us that Baker's MAGDOLITE is 5 ways better . . . in composition, preparation, strength, economy, and quality.

Don't say dolomite. Save dollars. Specify Baker's MAGDOLITE!

*Bernard Lauth was a partner of B. F. Jones, Sr., founder of Jones & Laughlin Steel Corporation.

ANOTHER AMERICAN ORIGINAL

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Security Muddle Lingers On

New Bill Aims to Restore Teeth Pulled by the Court

Supreme Court ruled overwhelmingly that U. S. security program was illegal because it was not properly authorized.

Congress is pondering legislation to authorize the current system.—By G. H. Baker.

▪ The current industrial security muddle will probably not be settled quickly.

Legislation to give specific approval to the government's clouded industrial security program is now pending in Congress.

Checks and Balances—Sen. John M. Butler (R., Md.), and Rep. Francis Walter (D., Pa.), both staunch supporters of tight government security, have introduced legislation to upset a recent U. S. Supreme Court ruling.

The ruling by the high court said that the present industrial security system established by the Defense Department was illegal because it had never been specifically authorized either by the White House or by Congress.

The court didn't say whether the White House or Congress had the authority to set up the program, and if so, what limitations should be placed on it. Chief Justice Earl Warren's majority did say that the old system did not fit traditional American concepts of justice because accused security risks were not guaranteed the right to face accusers or challenge government evidence.

Bill's Aims — The Walter bill would give specific authority to the Secretary of Defense to establish an industrial security program to "safeguard our industrial establishments without disclosing information injurious to our national security."

Rep. Walter says the controversial House Un-American Activities Committee, which he heads, will consider the measure promptly.

Give Defense Authority — The bill gives the Secretary of Defense wide authority to set standards for military security clearance and for procedures for handling cases in which clearance is suspended, denied, or revoked.

It would permit the Secretary to set regulations "designed to protect from disclosure all information which, in the opinion of the Secretary, would affect the national security, safety, or public interest, or would tend to compromise investigative sources or investigative methods."

Kozlov for Khrushchev?

Administration officials are more convinced than ever that Frol Kozlov is to be Nikita Khrushchev's successor.

Reasoning: Kozlov's tough talk in Washington; his aping of the blunt, stubborn Khrushchev tactics in bargaining; his prestige buildup.

Khrushchev, it is reported, is in less than perfect health. It is obvious that he has slowed down somewhat in recent months. If some State Dept. experts figured Kozlov right, he'll replace Khrushchev within a year or so—provided he doesn't stumble in the meantime.

Government Needs Help

Rather Mind the Shop—Ike and his top officials are finding it tougher to lure industrial leaders to Washington. Although there are a number of high federal jobs now open, there are few takers.

In less than 18 months, a new Administration will take over. Regardless of who wins the presidency in 1960, it's a certainty the winner will make a clean sweep and accept the resignations of Eisenhower appointees.

Not Worth It—Because time is running out, it's hard to get good men in business and industry who are willing to make the financial sacrifices necessary to taking government jobs. And few are willing to suffer the abuse often heaped upon them by small men in Congress, to serve for the relatively few months remaining of Ike's term of office.

Some now-vacant jobs will be filled by upping civil service workers to the top positions. Others will simply remain vacant for the final months of the reign.

Some business leaders are already associating themselves to the men they believe likely to win the presidential nomination—and the presidency. Those who guess right are certain to have an inside track on choice White House appointments to be made early in 1961.

Those who guess wrong will finish up politically smarter than when they started.

JACK-HAMMER FAILS TO FLAKE INLAND TI-CO®!

Crumbling concrete is easy with this powerful paving breaker. It hits with crunching impact at the rate of 1,200 blows per minute with 75,000 ft. lbs. of developed energy. Yet, while thousands of repeated blows actually hammered this TI-CO galvanized sheet into the ground at the point of contact, there wasn't a trace of flaking of the zinc coating!

More proof that you can subject TI-CO sheets to deep-drawing, spin-drawing, punching, crimping, perforating, Pittsburgh lock-seaming or any other tough fabricating process, and you won't flake TI-CO!

That's why Inland TI-CO galvanized sheets are now being used in scores of new applications and products. TI-CO is available in cut sheets or coils in gages 8 to 30 inclusive and widths as great as 60 inches. You can get it with dry, oiled or chemically treated surfaces to meet your production needs. A free, informative booklet will be sent you upon request. For your galvanized sheet requirements, consult your Inland representative.

Hammer operator runs finger around depression made in TI-CO sheet. Although hammered area resembles a shot-peened finish, the zinc coating has not flaked

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Why Subcontractors Are Needed

Defense Jobs Are Too Big for the Giants Alone

There's ardent wooing of subcontractors by the Farwest's aircraft-missile industry.

Reason: Today's weapons systems are too complex for any one company to handle.

North American Aviation goes all out to use talents in small shops.—By R. R. Kay.

▪ There won't be any freeze-out of small subcontractors by the Coast's aircraft-missile industry giants.

Small firms all over the country now in the business—or looking to get into it—should take heart. Their future looks bright.

Help Wanted—Why? Today's weapon systems are just too big and complex for any one company to handle. The long-standing practice of do-it-yourself-as-much-as-you-can is out the window.

New weapons need the tremendous variety of skills that you find among the small outfits. So there's ardent wooing of subcontractors.

As time goes by, the role of the giants will become more and more an overall management job for a system. Here's a good example.

North American Aviation, Los Angeles, is all-out to keep the little fellow in the act. President J. L. Atwood says this is a must.

Subcontractor's Share—The firm is manager of two advanced weapon systems: the B-70 Valkyrie intercontinental bomber and the F-108 Rapier triple-sonic fighter.

Subcontracting will benefit 20,000 firms across the country. They'll get 70 pct of these projects. On NAA's former fighter, the F-100, they got 50 pct.

Passing the Word—Here are some features of NAA's program. When the country awards a good-sized subcontract, it passes the word at once to the Small Business Administration's office in that region. This helps companies in the subcontractor's area get in touch with him for a possible slice of the work.

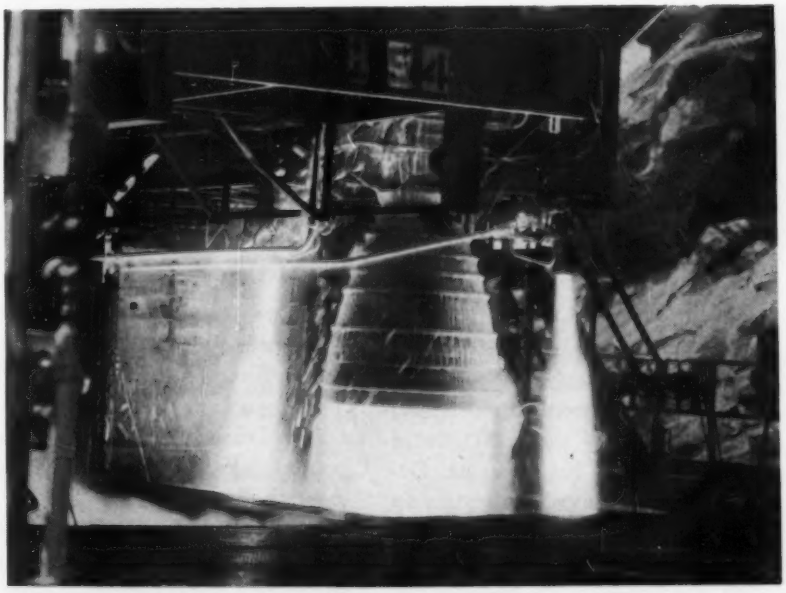
North American has a full-time corporate small business administrator, with a man at each division. It's his job to see that bidders get a fair shake.

Full Report—Another feature: A check-list on each subcontract or purchase order makes every NAA buyer take small business into account. He has to report: (1) How many companies were approached; (2) whether small business got the contract; and (3) if a large company got it, why?

Still another angle is a clause that goes into all contracts to suppliers. It opens the door to small firms by making the supplier furnish NAA with quarterly reports on its small business commitments.

North American is making a real drive to use the various native talents of small shops. The program is far-reaching. It should bring good results to small business—and to the Air Force as well.

Thor Leaps to Life After Deep Freeze



ROCKET ENGINE TEST: Engine of ice-coated Thor rocket starts immediately after 72 hour exposure to freezing temperatures. Environmental tests are part of development work on the missile engine, designed and built by Rocketdyne, a division of North American Aviation.

Geneva Works shears hot rolled strip on high-speed Wean line

This high-speed Wean line for shearing hot rolled strip enables the Columbia-Geneva Steel Division of U. S. Steel to furnish its customers with top-quality sheets to meet a wide range of requirements. Designed to handle coils in widths up to 72", it provides for fast, accurate side trimming, shearing, and leveling. Equipment in the line includes a McKay processing uncoiler (with coil opener), flying shear, scrap chopper, and leveler.

Whatever your needs for continuous steel processing lines, it will pay you to take advantage of Wean *creative engineering*.

We will welcome the opportunity to discuss your requirements with you at your convenience.

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Wear Your Inserts Out Faster

It Pays Off in Increased Tool Capacity

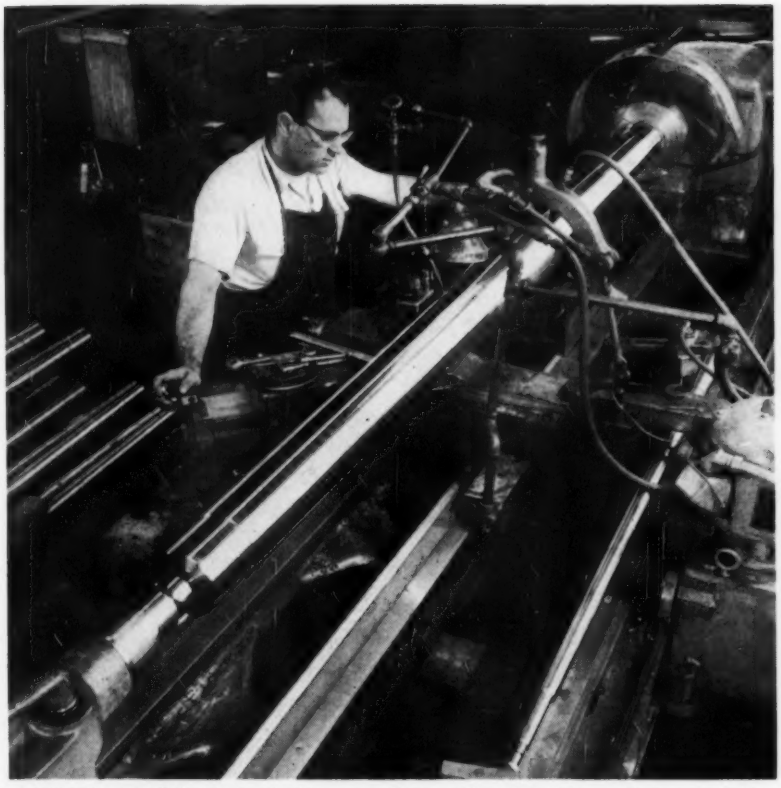
Kennametal has been preaching pushing machines harder to get more work at only the cost of the cutting inserts.

Initial machine shop reaction indicates the technique really works.—By E. J. Egan, Jr.

▪ Initial machine shop reaction to Kennametal, Inc.'s campaign to push shorter lives for carbide cutting tool inserts (The IRON AGE, May 14, p. 129) is mostly favorable.

Many shops seem to approve—in principle, at least—the idea that it's worth a few extra cents in shorter tool life if it returns dollars of higher machine output.

To preach this philosophy which Frederick W. Taylor first advocated more than 50 years ago, Kennametal field representatives have been buttonholing every machine shop superintendent and foreman within reach.



BUILT TO TAKE IT: Modern machines, like this Monarch tracer lathe, have the speed and power to make shorter cutting tool lives pay off.

How it Works — And they've been saying to these men, in effect, "Try a quick-indexing, throwaway-type carbide tip on at least one job that means big money to you. Pour on the coal so you'll wear out a fresh cutting edge in, say, 30 minutes. Then tell me if it's worth the few added pennies in tool cost to get that much more work out of your machine."

The field men have been getting their answers and bouncing them in to Kennametal headquarters in Latrobe, Pa.

Judging from these reports, some companies are way ahead of the game; they consider even a 30-minute tool life as something for turtles only. One salesman got a pleasant surprise from a company in southern Illinois. It's happily making money on a job where the tool life is only six minutes. It pays the shop to use up one tool tip on each workpiece.

For Just an Hour—In Denver, another company aims for a 10-minute life on each cutting edge of indexing-type carbide wafers, figuring that a six-edge triangular tip should be worn out after an hour.

In reporting on still another company, one of Kennametal's West Coast representatives noted: "Orders have been given to remove pedestal grinders from the shop. Since the (machine) operators won't be able to grind their tools, they'll be forced to use throwaways."

Other Side — These reports are encouraging, of course. But there are others of the doubting-Thomas and polite-brushoff type filtering back to Latrobe, too.

Thus it will require sustained, hard - hitting effort from many sources and many directions to push the nation's machining facilities to a new high in productivity. There's no doubt that modern machine tools and cutting tool materials can stand the pace. They've been ready for a long time.

INDUSTRIAL BRIEFS

Titanium Development—A major titanium product development program for the pulp and paper industry has been inaugurated by Mallory-Sharon Metals Corp., Niles, O. The development program is being launched as a result of many applications which have been found for titanium in this industry.

Pig Iron and Pipe — Alabama Pipe Co., Anniston, Ala., has become a division of Woodward Iron Co. of Birmingham, following approval of the merger by Woodward stockholders. The consideration was an exchange of stock, which involved an increase in Woodward's capital from $24 million to $29 million. Woodward is a major producer of pig iron; Alabama Pipe manufactures various kinds of iron pipe.

African Manganese—The World Bank has made a loan equivalent to $35 million for development of high-grade manganese deposits in Gabon Republic, French Equatorial Africa. The loan will help finance equipment and services for mining operations, a 45-mile cableway, and a 180-mile railway connection to the Atlantic port of Pointe Noire in the Congo Republic.

"You do nice work!"

Gear for Missile Listeners—General Electric has a $1 million contract for Greenland Contractors, Trenton, N. J. to supply outdoor substations and metal-clad switchgear for the USAF's Ballistic Missile Early Warning System Station near Thule, Greenland. The Thule installation is designed to scan air space over the Soviet Union.

Open for Business — Threaded Products, Inc. is a new firm concerned with the manufacture and centralized inventory of screws, nuts, bolts and other types of threaded fasteners. Mr. Ben Fitzpatrick, organizer of the new company, announces the opening of offices, factory and warehouse facilities at 6542 Penn Ave., Pittsburgh.

International View—A new division, Dayton Rubber International, has been formed with headquarters in Dayton, O., to unite all overseas activities of The Dayton Rubber Co. The division will embrace Dayton Rubber's current Foreign Technical Service Program and export operations involving product shipments to 45 countries.

Philippine Canmaking — The Container Machinery Div., E. W. Bliss Co., Canton, O., has an order to supply and install all canmaking equipment, auxiliary equipment and machine shop and maintenance equipment for a new can manufacturing plant. The facility is being built in the Philippine Islands by The Standard Investment Corp., Manila.

Anchor Joins Kennedy — The merger of D. S. Kennedy & Co., Cohasset, Mass., with Anchor Metals, Inc., Hurst, Texas, has been approved. The merged corporations, continuing the name of D. S. Kennedy & Co., will create capital of $5 million and total annual sales for the fiscal year of '59 of about $20 million. Anchor will continue as an operating division.

Change in Name—Electric Steel Foundry Co., Portland, Ore., has purchased the Pacific Alloy Engineering Corp. from Pelton Steel Casting Co., Milwaukee. The company will operate as a subsidiary of ESCO, and its name has been changed to Pacific Alloy Corp. ESCO districts will act as sales outlets for Pacific Alloy products.

Press for Kawneer—A 2200 ton Sutton extrusion press has been ordered by Kawneer Co. for installation in its Richmond, Calif. plant late in 1959. Now being built at the Sutton plant at Bellefonte, Pa., the horizontal, hydraulic press will be used for the extrusion of aluminum architectural sections and components.

Electric Motor Expansion—Century Electric Co., St. Louis, will build a new motor plant at McMinnville, Tenn. The location was chosen because it is closer to major markets and materials suppliers, Century says. It will also allow the company to enter markets it is not now serving.

Allis - Chalmers Reaches 21—Allis-Chalmers' acquisition of Tractomotive Corp., Deerfield, Ill., was completed June 30, following approval by the Tractomotive board of directors. It becomes the 21st plant in the Allis-Chalmers family and will be operated as the Deerfield Works.

Search for Better Weldments—Airline Welding & Engineering has broken ground for a new $150,000 facility at Los Angeles. The plant will include a precision sheet metal fabrication shop and laboratories for research in welding techniques for exotic metals, alloys, and complicated assemblies. Completion date is scheduled for Oct. 1.

All About Stainless—A new bimonthly publication for users of stainless steel is being produced by the Stainless and Strip Div., Jones & Laughlin Steel Corp., Detroit. Entitled "Explorer," its purpose is to review new developments and applications of stainless for industrial, commercial, and defense products.

Really Tough Where the Power Hits the Ground—thanks to TOCCO* Induction Heating

The Eimco Corporation of Salt Lake City manufactures heavy-duty earth moving and mining equipment of many kinds. All of their equipment must be engineered for tough work in the roughest kind of terrain, and all of it runs on tractor track that must stand up to the toughest abuse.

Superior Quality

Recently Eimco installed a 100 kw, 10,000 cycle TOCCO machine for heat treating track links. This equipment assures a completely uniform hardness pattern—the same every time for one link or one million. Furthermore, the parts are drawn as well as hardened by one TOCCO machine with one operator.

Increased Production

In addition to superior quality, TOCCO increased track link production over 400%. Formerly, one man could produce 35 links per hour; now, with TOCCO, he produces 150!

Whether you're looking for product improvement, increased production, or lower unit costs, it will pay you to investigate TOCCO Induction Heating.

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Rollers are crowned to prevent end-loading and the resultant spalling of races. Directional trueness is maintained by retainers of standard bronze or "Rollube" ferrous alloy of one piece or two piece construction.

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COMPLETE LINE OF RADIAL AND THRUST CYLINDRICAL ROLLER BEARINGS

G. F. Halfacre, elected vice president, manufacturing, The New Jersey Zinc Co.

Electric Products Co. — **R. J. Berry,** appointed corporate vice president; **J. R. Williams,** appointed vice president, Standard Products Div.; **J. H. Kellogg,** appointed vice president, Power Equipment Div. and director of the company; and **R. A. Morey,** named treasurer.

Borg-Warner Corp., Spring Div. —**S. J. Becker,** appointed vice president and chief engineer.

Granite City Steel Co.—**F. J. Risberg,** appointed St. Louis-Moline district manager, sales.

The Babcock & Wilcox Co., Boiler Div. — **R. K. Behr,** named manager, New York district sales office; **N. J. Connor,** appointed a sales consultant; and **G. S. White,** named manager, Boston district sales office.

U. S. Steel Corp., Tennessee Coal & Iron Div.—**G. J. Stewart,** promoted to asst. to vice president — sales, Western area; **R. C. Rhodes,** named general manager—sales, solicitation, Fairfield, Ala.; **T. W. Benton, Jr.,** becomes general manager — sales, distribution; and **R. J. Thomas,** named manager, sheet and strip products sales.

Pratt & Whitney Co., Inc.—**D. H. Hayward,** elected asst. secretary.

National Can Corp.—**J. T. Shipley,** elected vice president.

Chase Brass & Copper Co., Warehouse Div.—**D. S. Soliday, Jr.,** named product manager—stainless steel.

Valley Mould & Iron Corp.—**W. C. H. Ramage,** elected president and chief executive officer; **C. E. Swab,** elected vice chairman.

Allis-Chalmers Mfg. Co.—**H. H. Heinecke,** appointed asst. to director, domestic sales, Industries Group.

C. R. Cary, named board chairman, Leeds & Northrup Co., Philadelphia.

D. H. Schultz, named senior vice president, Leeds & Northrup Co., Philadelphia.

E. F. Andrews, named director, purchases, Allegheny Ludlum Steel Corp., Pittsburgh.

General Electric Co. — **Adam MacKenzie,** appointed marketing manager, Lamp Metals and Components Dept., Cleveland.

Copperweld Steel Co. — **John O'Connor III,** named manager, Pittsburgh district office.

International Business Machines Corp.—**L. A. Howard,** appointed procurement manager, Owego, N. Y. facility; **M. C. Stutzbach,** appointed purchasing agent, research

(Continued on P. 90)

G. E. Beggs, Jr., elected executive vice president and director, Leeds & Northrup Co.

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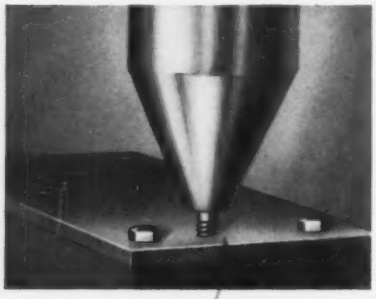

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at the famous screws in stick form that can cut your assembly time in half, improve your profits. Available in steel, brass, aluminum and nickel silver alloys in both machine and thread-forming screws. Send for a free sample of Screwstick .

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(Continued from P. 89)

laboratories in Westchester and Poughkeepsie, N. Y.

Anaconda Aluminum Co.—**D. F. Henry,** appointed manager, market research, Louisville, Ky.

William Bayley Co.—**E. G. Gebhardt,** appointed sales manager.

J. M. Hoffman, promoted to mining manager, The Anaconda Co.

Aeroquip Corp., General Logistics Div.—**J. M. Van Dam,** appointed general manager, Burbank, Calif.

The Beryllium Corp.—**Dr. Bernard Kopelman,** appointed technical director.

American Can Co., Bradley-Sun Div.—**R. H. McCarthy, Jr.,** appointed director, sales.

J. C. Brantley, appointed asst. director, research, Union Carbide Nuclear Co.

C. A. De Vries, becomes purchasing agent and asst. to the president, The Fosdick Machine Tool Co., Cincinnati.

Foote Mineral Co. — **D. W. Mitchell,** named coordinator, research and production.

Canadian Duff-Norton Co., Ltd. —**J. C. Nairn,** named sales manager.

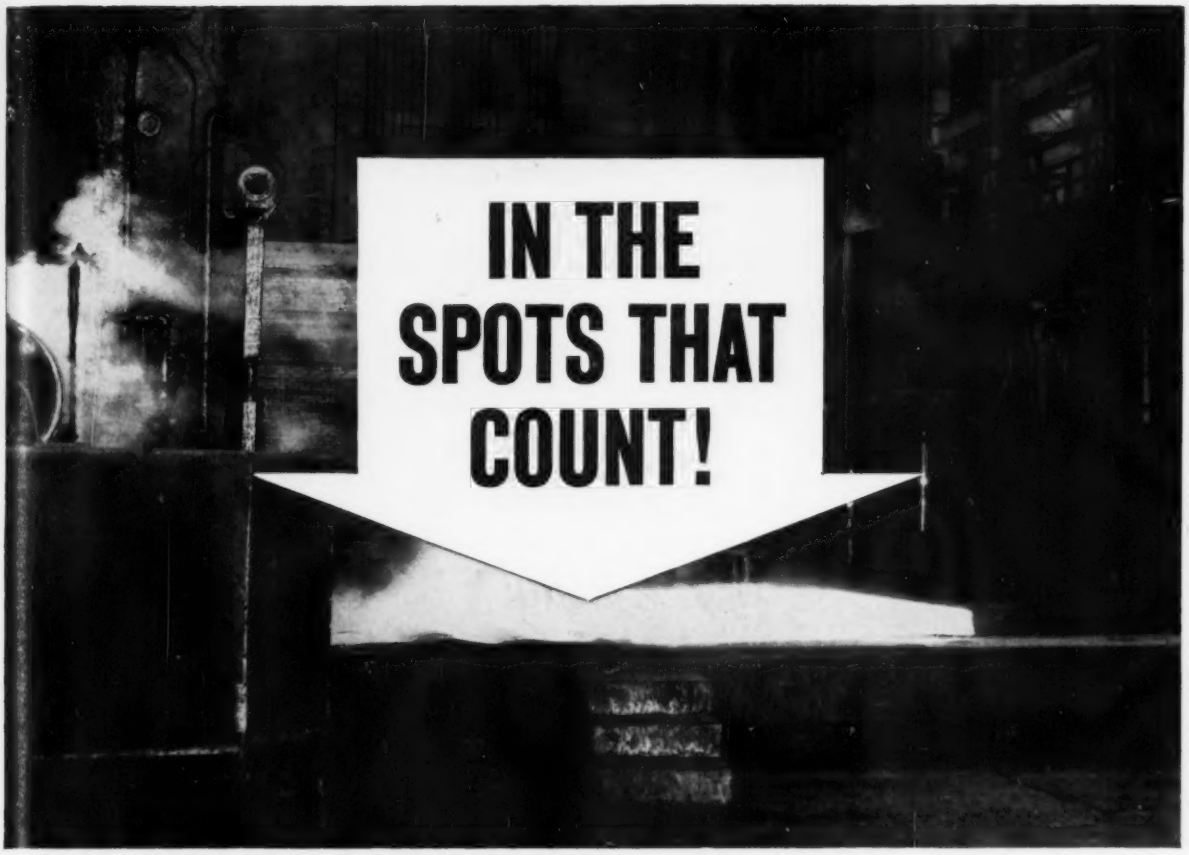
Westinghouse Electric Corp.— **J. A. Garvey, Jr.,** appointed tax counsel, planning and special projects, Pittsburgh.

E. J. Lally, appointed editor, American Metal Market.

Kaiser Aluminum & Chemical Corp. — **R. F. Buechner,** named works manager, Trentwood, Washington.

Allegheny Ludlum Steel Corp.— **N. W. Hayson,** named manager,

(Continued on P. 94)



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Solenoid-hydraulic pilot controlled 4" and 2½" Hydro-Cushion Homestead Operating Valves; and Lever-Seald Hydraulic Stop Valves; 800 pounds working pressure.

Six days a week, twenty-four hours a day, 250 times an hour, the tilt tables and middle roll of an East Coast Plate Mill are exactly positioned without shock, and held without creepage, by Homestead Operating Valves. This precision control has permitted record-breaking rolling of the hot steel slabs into plate.

Through more than *three and one-half million* split-second rollings during the two years the 2½" and 4" Hydro-Cushion Homestead Operating Valves have been in service, not one shutdown has been required for valve maintenance! Performance records such as these, are assured by the protected seat and cushioning action of the Homestead Valves.

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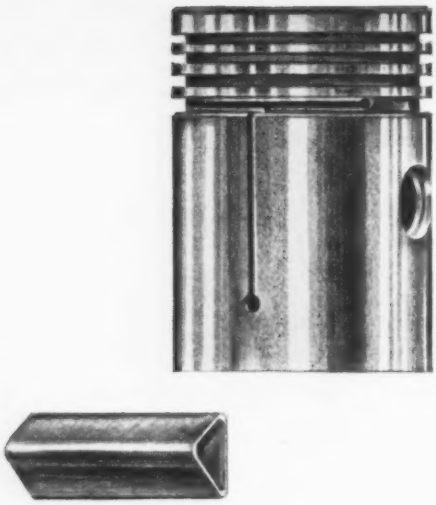

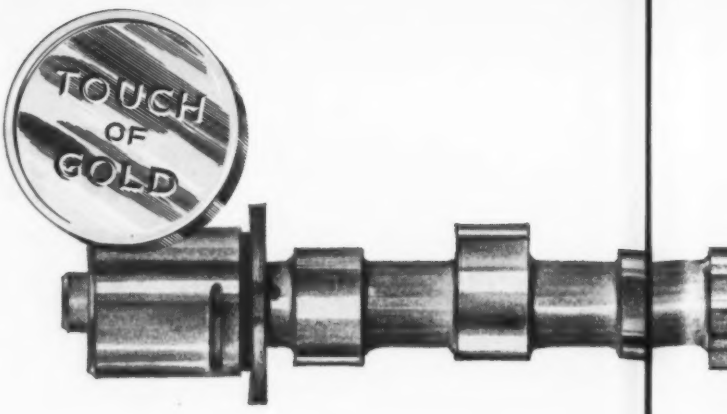

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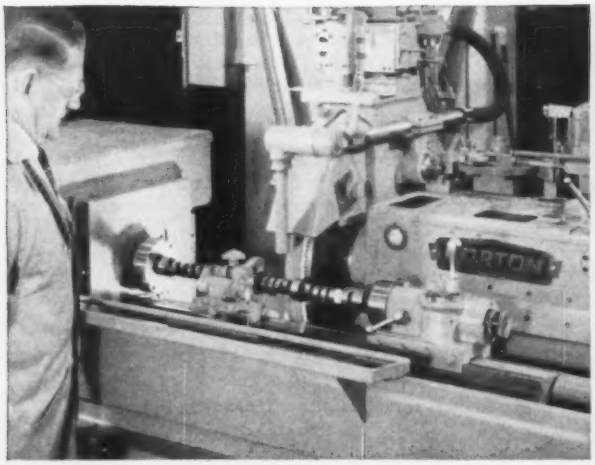
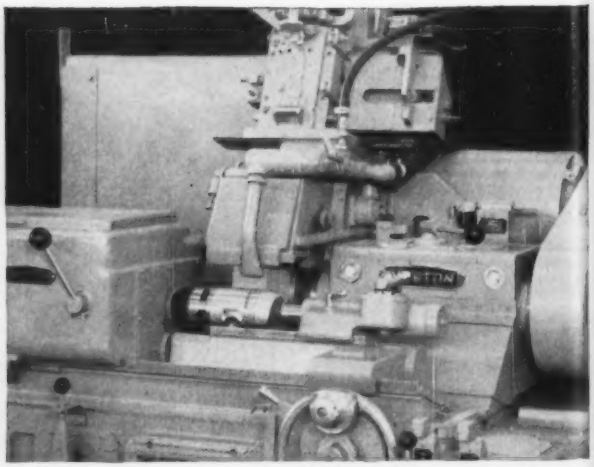
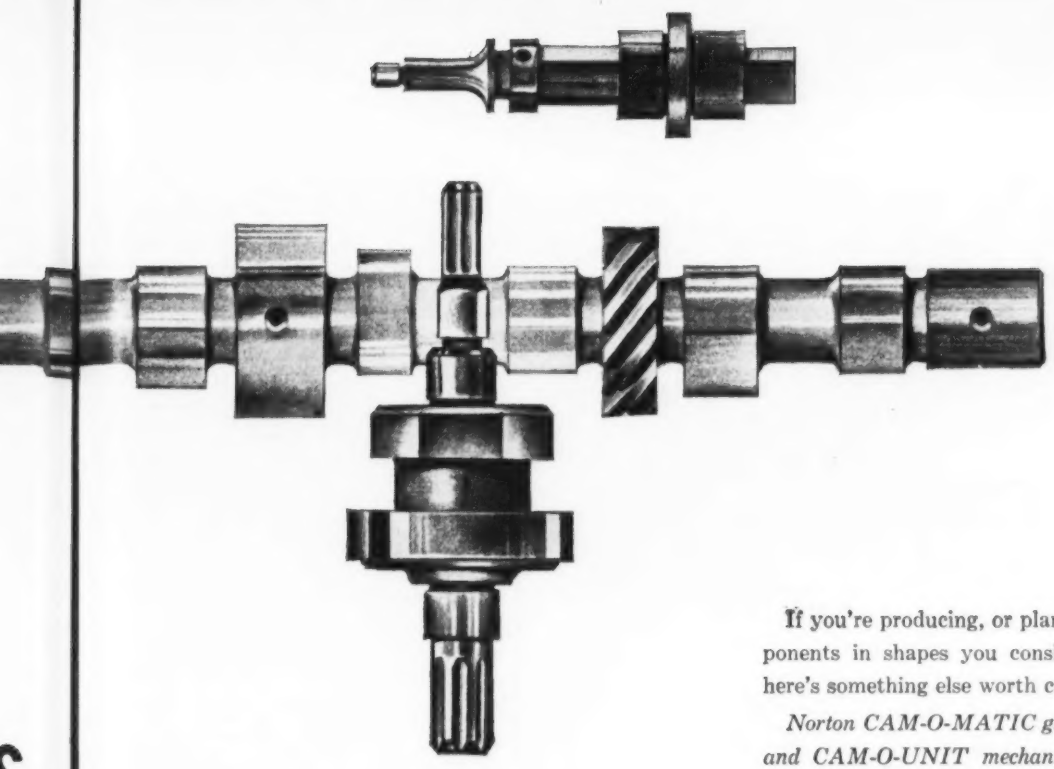


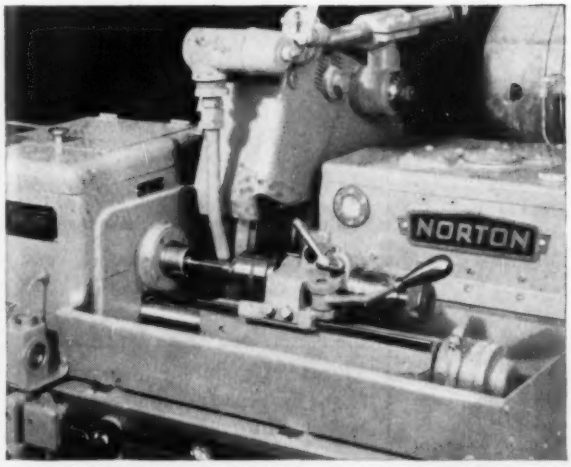
With a Norton No. 3 CAM-O-MATIC® Grinder, you grind all cams and the eccentric on an automotive-type camshaft automatically, in one handling. Automatic wheel truing and a patented device for grinding cam tapers in one or both directions are among the features that improve contour, finish and production rate.



A Norton 6" x 8" Semiautomatic Piston Grinder adds extra speed and economy to your grinding of elliptical pistons. Mechanism arrangements enable you to grind complex ovality into the skirt of a piston, as shown, or to produce standard ovality or different amounts of relief over a wide range.



. . . like these



Norton CAM-O-UNIT* Mechanisms, made in varying work capacities, are particularly valuable for extending the proved advantages of Norton CTU cylindrical grinders to the grinding of cams, elliptical pistons and many other forms. The CAM-O-UNIT mechanism shown is attached to a 6″ CTU to grind the three faces of a carbide tool bit.

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(Continued from P. 90)

purchasing, Maintenance, Repair and Operating Supplies Dept.; and **A. B. Wadsworth, Jr.,** named manager, purchasing, Raw Materials, Equipment and Construction Dept.

General Electric Co.—**H. C. Nelson,** appointed superintendent, Anaheim, Calif., plant.

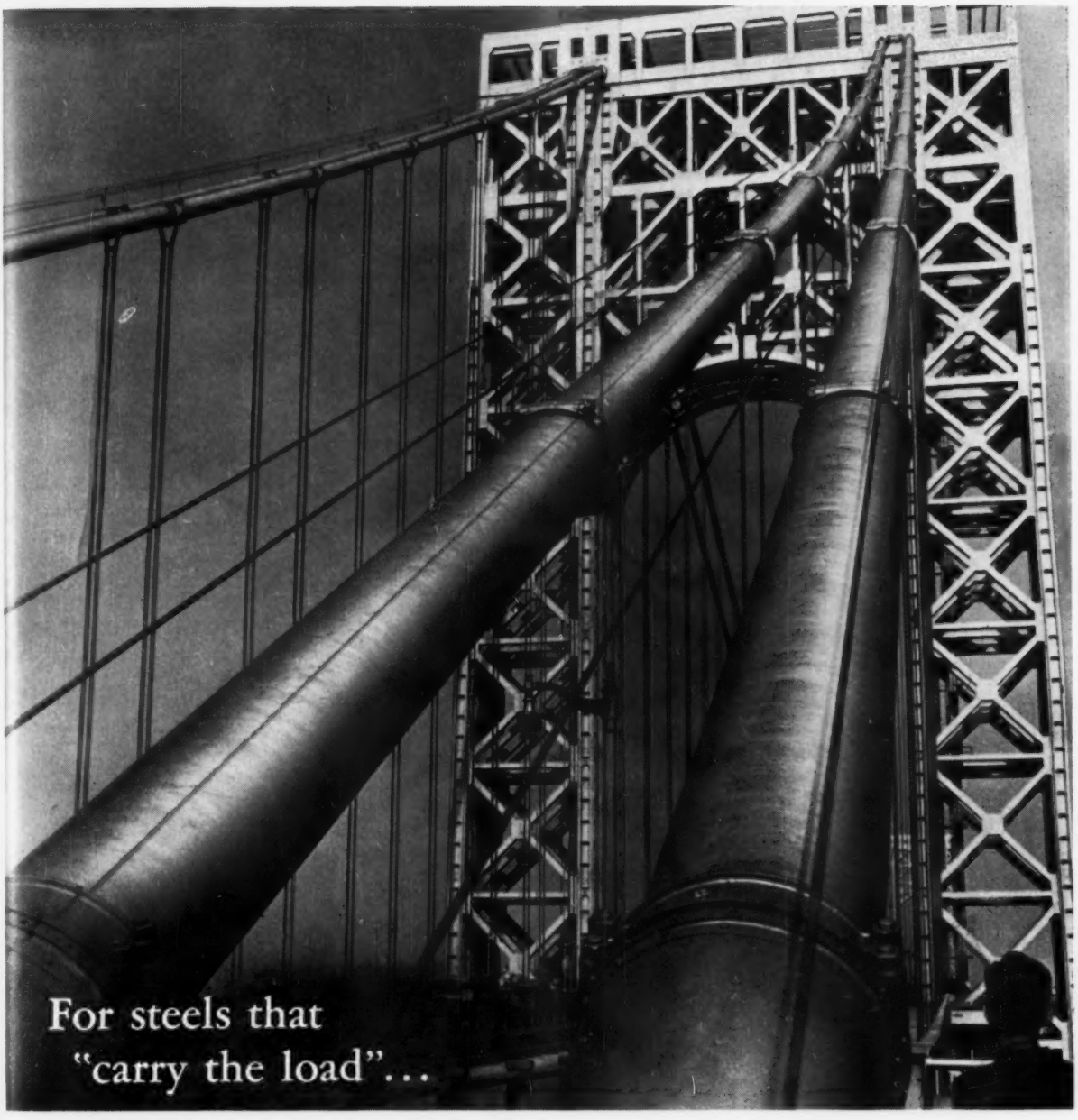
H. E. Robinson, appointed director, production planning programs, Jones & Laughlin Steel Corp.

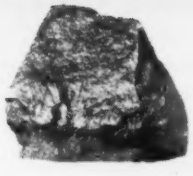
W. L. Cressman, named asst, general manager, sales, Jones & Laughlin Steel Corp.

Pratt & Whitney Co., Inc.—**H. A. France, Jr.,** appointed manager, quality control.

Rheem Mfg. Co., Home Products Div.—**R. C. Perry,** appointed national product manager, commercial water heaters; **M. M. Fisher,** appointed plant manager,

(Continued on P. 96)





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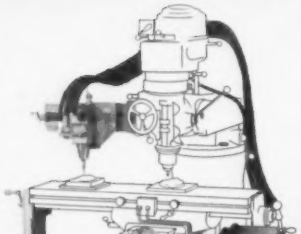

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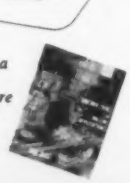

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(Continued from P. 94)

heating and air conditioning, Chicago plant.

C. D. Smith, appointed manager, Ravenswood, W. Va., works, Kaiser Aluminum & Chemical Corp.

C. K. Ross, appointed comptroller, United States Steel Products Div., U. S. Steel Corp.

Jones & Laughlin Steel Corp., Stainless and Strip Div.—**W. L. Weir,** appointed superintendent and **A. E. Engelbert,** appointed asst. superintendent, Detroit.

Atlantic Steel Co.—**G. E. Brooks,** appointed manager, mill sales.

Fort Duquesne Steel Co.—**C. F. Lloyd, Jr.,** appointed general sales manager and **A. T. Engle, Jr.,** elected asst. secretary.

Consolidated Electrodynamics Corp., Transducer Div.—**H. B. Lewis,** appointed chief engineer.

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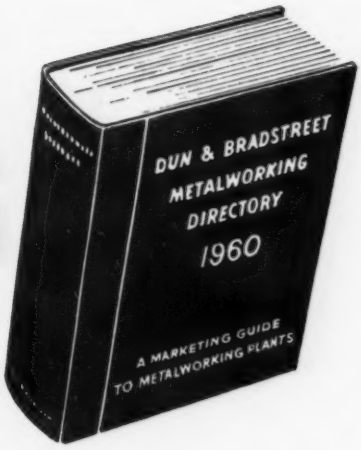

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2. **Number of Employees**—Average number of employees at plant location. Determine your average sales per customer employee and you can measure your dollar potential with each plant.

3. **Name of Management Personnel**—Ideal for mailing list purposes. You can send your literature to the person you want to reach whether he is in Purchasing, Engineering, Production or General Management.

4. **Products Manufactured**—A description of the primary operation of a plant showing what they produce. You can rapidly determine if your product is a component of their product.

5. **Plants Arranged Geographically in Section I**—Broken down by states, by cities within states, and alphabetically by plants within cities. You can pinpoint, by name, your prospects in each sales territory. Street address and postal zone number shown for each plant.

6. **Plants Shown by Product Classification in Section II**—Plants are arranged according to their product classification. Over 170 four-digit Standard Industrial Classification groupings. Each plant shown under each of its product classifications. Use this section to check coverage by line of business.

7. **Plants Arranged Alphabetically**—Section III lists all plants nationally in alphabetical order. If you know the name of the plant, you can find its location.

8. **County by County Statistical Summary in Section IV**—You can quickly determine the number of plants in any line, in any sales territory—match these against the number of customers you have in each state, and immediately know how thoroughly you are covering the market. Number of employees shown indicates size of plant.

9. **Secondary Breakdown Shown in Section IV**—This is where you can find hidden prospects for your products. For example: Suppose you sell to foundries. Many plants produce and sell castings as a secondary part of their operation but are not well known for this function. The secondary breakdown in Section IV, will show how many companies there are of this type in each county. Section I or Section II will tell you who they are. A unique way of finding hidden prospects never before available.

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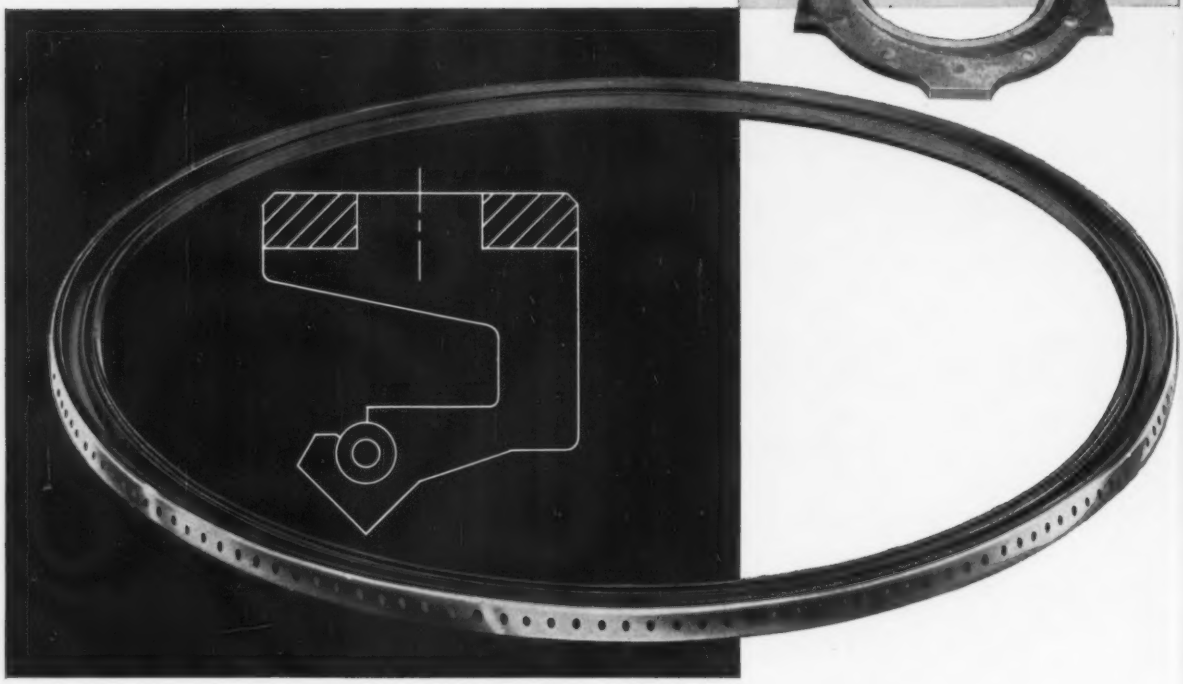

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More facts: Chicago Rawhide's new Flex-i-Band Seal will not spin in the bore. See that steel O.D.? That's why. It holds the seal tightly in the bore with sure metal-to-metal contact. And the rubber, molded into the perforations cannot shear its bond.

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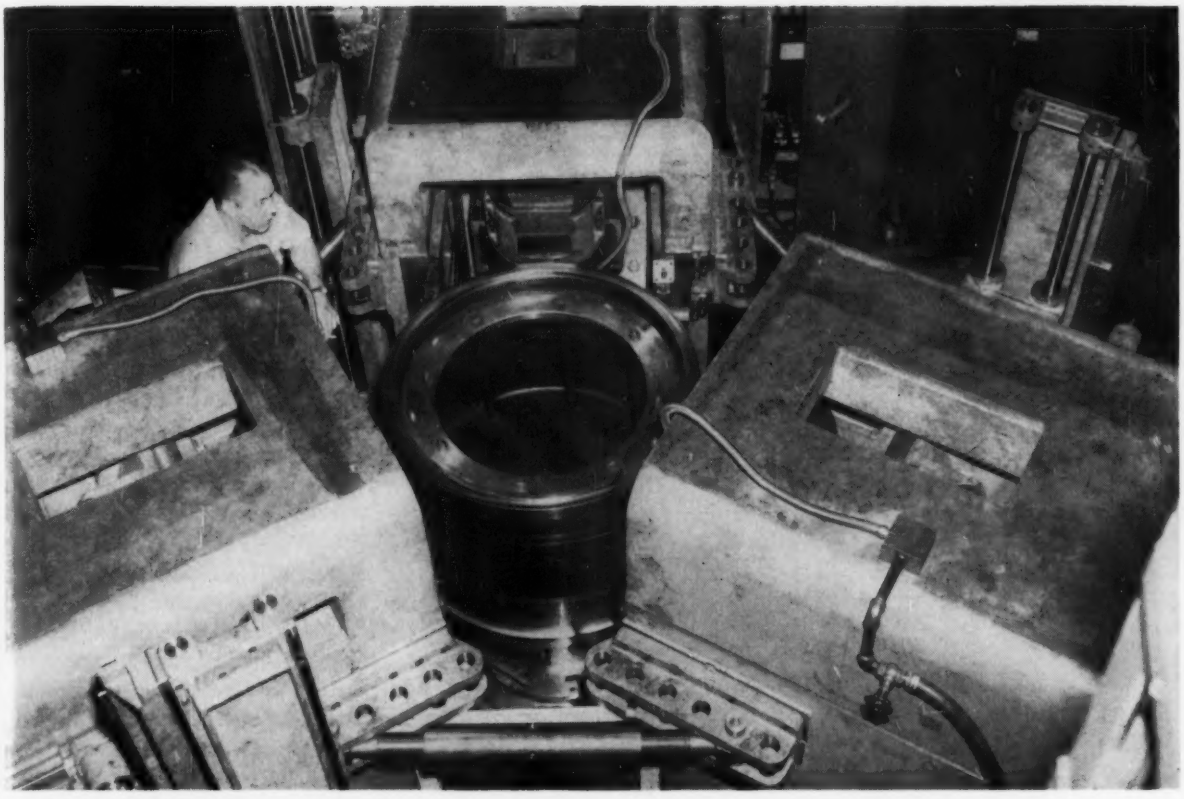
OIL SEAL C/R DIVISION

CHICAGO RAWHIDE



FAST STRETCH: Three massive roller stations reduce wall thickness and lengthen the hollow cylindrical blank as it rotates and feeds upward. A 175,000-lb force holds each roller set; feed force is 75,000 lb.

Machine Forms Giant Tubes In One Pass, Without Welding

This massive machine literally flows hollow, relatively thick-walled cylindrical blanks into long, thin-walled tubular sections.

Speed and the use of low-cost tooling are key factors.

▪ How would you produce a thin-walled (say 0.015 in.) steel tube 80 in. in diam and 30 ft long in one piece, without any welding whatsoever? A lot of people would like to know how, including the men who design and build the nation's rockets and missiles.

Lodge & Shipley Co., Cincinnati machine tool builders, believes it has the answer in a massive new machine tool with a name to match its size. The company calls it a Vertical Multi-Roller Radial Floturn Machine.

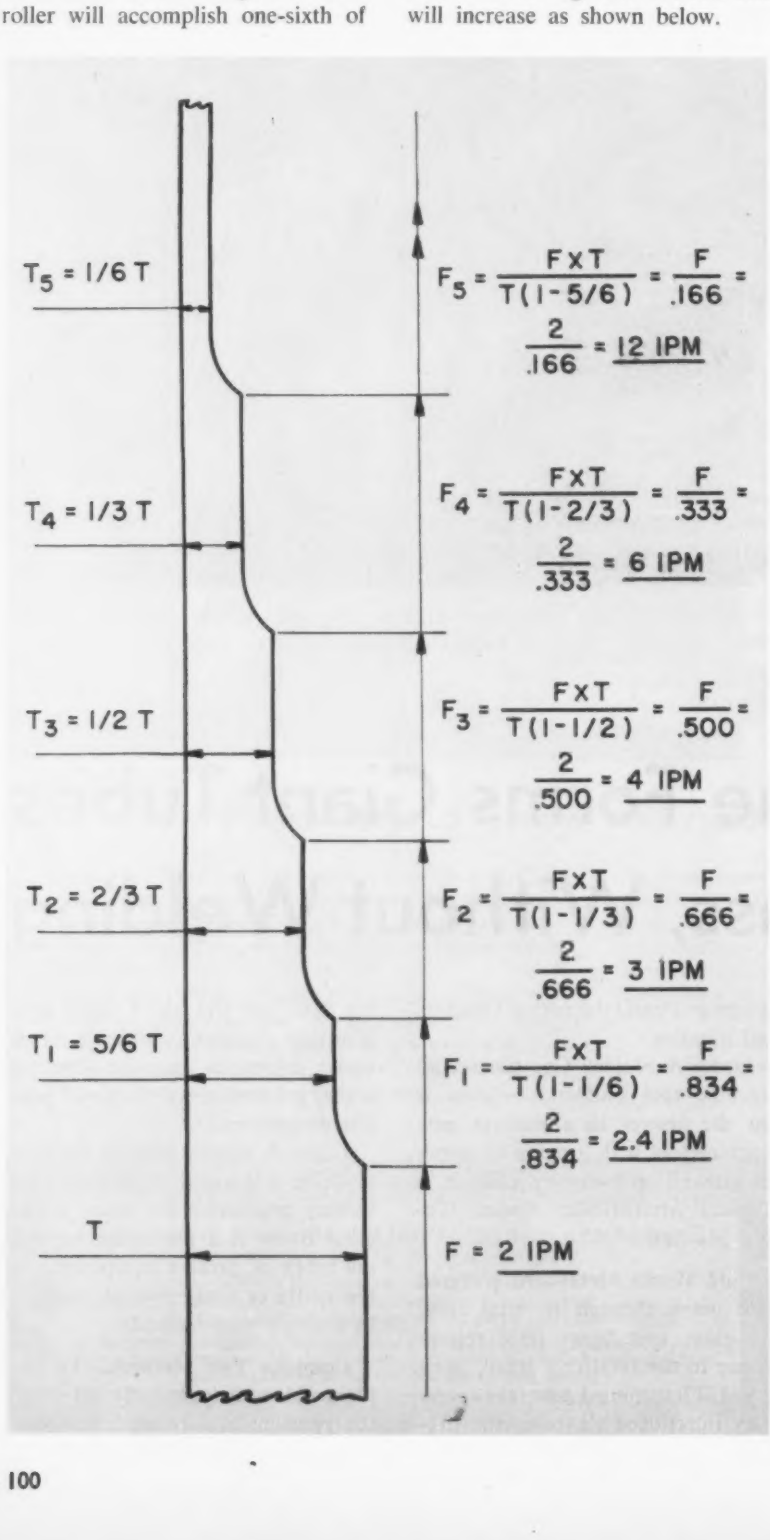
Cold Works Metal—As pictured here going through its trial runs, the giant unit bears little resemblance to the relatively small, horizontal Floturning Lathe the company introduced to the metalworking field just five short years ago. The new machine cold flows metal under enormous pressure—forcing it into predetermined shapes of precise dimensions.

Lodge & Shipley believes the new machine will make single-pass Floturning practicable for many workpiece forms that are either beyond the range of present equipment, or too costly or impossible to produce by multiple-pass methods.

Compare Two Methods—To explain this, company officials pose the problem of forming a cylinder

Reduce Thickness in Steps

For this hypothetical Floturning job on a blank with wall thickness "T," each of the three roller stations carries a set of five rollers. All three roller sets are angled so each roller will accomplish one-sixth of the total reduction as the blank makes one pass through the machine. Assuming an initial feed rate (F) of two in. per minute, actual feed rates through the five-roll sets will increase as shown below.


$T_5 = 1/6\ T$
$F_5 = \frac{F \times T}{T(1-5/6)} = \frac{F}{.166} = \frac{2}{.166} = 12$ IPM
$T_4 = 1/3\ T$
$F_4 = \frac{F \times T}{T(1-2/3)} = \frac{F}{.333} = \frac{2}{.333} = 6$ IPM
$T_3 = 1/2\ T$
$F_3 = \frac{F \times T}{T(1-1/2)} = \frac{F}{.500} = \frac{2}{.500} = 4$ IPM
$T_2 = 2/3\ T$
$F_2 = \frac{F \times T}{T(1-1/3)} = \frac{F}{.666} = \frac{2}{.666} = 3$ IPM
$T_1 = 5/6\ T$
$F_1 = \frac{F \times T}{T(1-1/6)} = \frac{F}{.834} = \frac{2}{.834} = 2.4$ IPM
T
F = 2 IPM

50 in. in diam., 150 in. long and with a wall thickness of 0.050 in. Using a blank about 30 in. long and 0.250 in. thick would take three passes on present equipment, they say. Moreover, the tool for the final pass would be 12 ft long and weigh about 13,000 lb.

They then point out that one pass on the new machine will transform the same size blank into a finished part. The job would require a tool only 34 in. long, weighing about 3680 lb. The cost of making patterns, casting, machining, hardening and grinding such tools runs their price up to between $4 and $5 per lb. Thus the saving in tooling alone for the new vertical machine would be somewhere between $37,500 and $46,500.

Present equipment poses other problems, also, such as: (1) making a flawless tool steel casting 12 ft long, (2) finding the equipment to machine and heat treat it, (3) supporting the tool in the forming machine, and (4) stripping off the finished part.

This mogul of the Floturn line aims its powerful forming action skyward. The direction could be symbolic; the new machine may well do its fair share in advancing space-age technology. Vertical Floturning is a practical way to form long, large-diameter tubular shapes.

Feeds Blank Upward—The new machine force-feeds a hollow, seamless, cylindrical blank upward past sets of hardened steel rollers. The express purpose is to reduce the wall thickness of the blank, to elongate it without changing its original internal diameter and to produce highly accurate wall thickness. It's done by controlling the extrusion rate of the blank.

To do this, the relatively heavy-walled blank is first placed over and around a solid cylinder of hardened tool steel which is assembled to the vertical spindle of the machine. This cylinder, called the "tool," is machined to the dimension, configuration and surface finish ultimately desired on the internal diameter of the finished workpiece.

Tool size depends on the workpiece to be produced. In general, it will be about 36 in. long and anywhere from 25 to 80 in. in diam. The lower circumference of the tool has a shoulder which supports the bottom edge of the blank.

Variable Spindle Speed — The vertical spindle of the machine has two functions. One is to rotate the tool and the blank at an optimum forming speed within a range of 50 to 300 rpm. The second function is to feed the blank and the tool upward through the forming rollers with a force of about 75,000 lb. Feed motion is actuated by a hydraulic cylinder inside the spindle.

Three sets of hardened steel forming rollers stand firm and ready on individual carriages to meet the rotating tool and blank as they move upward. The three carriages are positioned 120° apart around their common center, the spindle of the machine.

Each carriage mounts on an individual bed which is fastened to the base of the machine and bolted to the foundation as well. Each carriage also has a dual-adjustment feature: radial (in and out) to accommodate varying workpiece diameters; and vertical, so that all three sets of rollers may be brought to the same horizontal plane.

Adjustable Roller Angle — A yoke, which can be fitted with from one to five rollers, is also a part of each carriage. Each yoke is adjustable through 10° of angle. In this way, each roller set can have an optimum tilt for the efficient reduction of the blank wall. The machine will accommodate various roller diameters, up to 19¼ in.

Hydraulic power advances the rollers into forming position and retracts them at the end of the cycle. The hydraulic system will apply up to 175,000 lb of holding force at each roller station.

The accompanying diagram shows what happens in a typical forming operation. Each of the five rollers (all are the same diameter) in the three sets takes a 1/6 T reduction on the blank, and the feed increases as the wall thins out.

FOLLOWS TOOL FORM: Floturn inventor Claus Sporck (center) explains to a group of interested engineers how steps on the tool (mounted on machine) are reproduced in the finished workpiece.

For More Speed—It isn't necessary that all the rollers be equal in diameter. In some cases a heavier initial reduction under a large-diameter bottom roller will work the blank more thoroughly and increase the feed rate through the remainder of the set. Nor is the 2-ipm initial feed rate shown in the diagram a fixed factor; in practice, feed rates are infinitely variable up to 20 ipm.

Test runs on the new machine and on earlier versions have demonstrated that Floturning offers many potential benefits in the production of thin-walled sections. The process will cold work the toughest materials, and has reduced wall thicknesses to as little as 0.015 in., with close control of this dimension.

Offers Close Control—The process of cold working, in combination with judicious annealing, also offers a high degree of control over the mechanical properties desired in the finished workpiece. And by varying the finish on roller surfaces, it is possible to develop a variety of surface finishes on the final tubular sections.

The big machine with the long name will soon have a chance to prove its worth, Pratt & Whitney Aircraft is installing the first one at its East Hartford, Conn., plant. Initial assignment for the giant unit will be to form combustion chamber cases for the J-75 jet engine.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

TAPE CONTROLS: Profile milling machine for cutting cam contours is controlled through a digital-programming unit. Spindle speeds are from 200 to 1600 rpm. Open loop system has no feedback.

Russian Machine Tool Closeup

CHECK FINISH: Small-diameter ball bearings of 3/8, 5/16 and 11/32 in. diam, are electronically checked for surface finish on this automatic inspection unit. Up to 4000 are checked per hour.

■ Russian machine tools have some catching up to do to match U. S. makes.

At least that's the impression given by equipment displayed at the Soviet Exhibition of Science, Technology and Culture in New York City's Coliseum.

Tape controls, for example, are much less sophisticated than those in the U. S. The open-end, digital systems with no feedback exhibited in New York are not as advanced as closed-loop, analog programming making headway in America.

Russian automation also has a long way to go by American production standards. But electrical discharge machines seem closer to the mark. This photo report gives a cross-section view of the latest developments in Russian machine tools and inspection equipment.

GEAR CUTTER: Magazine-type fixture unloads pinion gears for automobiles from this spiral-bevel and hypoid-gear generator. One tooth is roughly cut every 18 seconds. Full cutting cycle is 2.5 minutes.

COPY BROACHING: An amplidyne tracer control unit guides the tool on this electric erosion copy-broaching machine. A pulse generator supplies power source. Rated current is 300 amp, voltage 25 v.

SORT ROLLERS: Conical roller bearings about 0.4 to 0.8-in. diam up to 1.7 in. long are electronically gaged and sorted by diameter and taper at 3500 per hour on this machine. Unit handles 32 sizes.

AUTOMATED LATHE: Up to 30 shafts 15 in. long and 2 in. diam are turned per hour on this lathe equipped with tape controls and automatic loading and unloading. Spindle speeds are 100 to 500 rpm.

Natural Gas Can Improve Blast Furnace Operations

By T. F. Baily—Consultant, Newcomerstown, O.

A test by the Bureau of Mines brings natural gas back into the steelmaking picture as a fuel.

Bearing in mind that good coking coal might not always be around, natural gas, plentiful in most areas, may fill the expected void.

▪ Natural gas, blended with coke, can lower coke consumption and increase steel output. Convenient and plentiful to most steelmaking areas, natural gas is high in hydrogen and contains no ash nor sulphur.

A recent two-week test using natural gas in a 16-ton blast furnace gave some interesting results. Conducted by the U. S. Bureau of Mines, the findings, practically applied, could help stem the tide of coke's depletion from the ground.

Worth Considering—This could serve as an available fuel and economical replacement for coke. Also, coke-oven gas, where available, can be used interchangeably with natural gas on a Btu basis.

The use of natural gas to replace coke in the blast furnace should give all of the advantages to be gained by the use of steam injection, oxygen enrichment of the blast and high blast temperatures. It will, in turn, provide increased capacity and balanced operation of the furnace. In addition, natural gas should lower the slag volume per ton of iron as well as the total sulphur, with a saving in the overall cost of fuel.

Expensive?—On a thermal basis, 1080 Btu natural gas at 50¢ per M is equal in cost to coke at $12.50 per ton. In most steel plant locations, natural gas can be purchased at this price or less.

Steel plants located at some distance from their coal supply and near a source of natural gas, will therefore show a considerable saving in fuel cost if natural gas is used to replace a portion of the coke.

The successful test-run recently made by the U. S. Bureau of Mines on a 16-ton blast furnace yielded interesting results. During the test period, the coke consumption was lowered from 1514 to under 1000 lb per net ton of iron with the introduction of 3500 cu ft of 1080 Btu natural gas. This changeover raised the blast temperature to 2250°F and the production rate from 16 to 20 tons daily.

How About Heat?—When 12 lb of carbon are burned to carbon monoxide with air preheated to 700°C (1292°F) 42,018 cal are made available in the hearth of the blast furnace. Also, there is sensible heat in the carbon burned at the tuyeres. It amounts to 7200 cal, making a total of 49,218 cal. The theoretical reducing capacity of the 28 lb of CO produced is 15.68 lb of iron.

On the other hand, when 16 lb of natural gas are burned to CO and hydrogen (H_2) with the same amount of air and blast temperature, only 19,768 cal are available in 28 lb of CO, 4 lb of H_2 and 53.6 lb of nitrogen. Its theoretical reducing capacity is 76.16 lb of iron.

Hydrogen Enrichment—If natural gas is introduced at the tuyere level of the blast furnace where it is burned to CO and H_2, it has the effect of increasing the reducing capacity of the gas by hydrogen enrichment.

This can be done if the temperature of the blast is increased. With the use of oxygen to provide the required temperature in the hearth, the furnace may be balanced for reducing capacity, heat input and temperature with a minimum of fuel.

Combustion at Work—Another factor is the combustion of a small portion of the H_2 and CO to H_2O and CO_2 in the hearth of the blast furnace. This provides sufficient hearth heat without increasing the blast temperature or introducing oxygen. Adequate reducing capacity is also maintained in the furnace gas.

This method would require fast driving and coarse or slow-burning coke. When operating on self-fluxing sinter, one net ton of pig iron would require 720 lb of coke and 7000 cu ft of 1080 Btu natural gas with a blast temperature of 650°C (1202°F).

Additional Space — More room for the burden in the stack is made by substituting methane (CH_4) for steam and coke. Actually, 18 lb steam and 27½ lb coke would be replaced by 16 lb or 358 cu ft CH_4.

This tends to increase both reducing capacity and heat. It also increases production rate over coke practice, eliminating humidification from the blast.

Gas and Coke Make Good Combination

Introducing these properties—

	Blast Additions		Tuyere Additions					Blast Furnace Capacity, cu ft
	Coke, lb	H_2O, grains/cu ft	Air, lb	H_2O, lb	Heat, °F	Natural Gas, cu ft	O_2, lb	
Example A	1275	21	4748	180	1292	.....	....	78,234
Example B	1000	....	4260	....	1508	3330 (cold)	100	74,625
Example C	400	....	2280	....	2282	10,000	442 (cold)	61,716

brings these results—

	Capacity, net tons	Heat of Combustion, cal	Heat in Coke, cal	Total Hearth Heat, cal	Heat in Gas at 1500°C, cal	Heat above 1500°C, cal	Fe Reducing Capacity, lb
Example A	1044	2,686,006	563,400	3,249,406	2,660,445	588,961	1528
Example B	1100	2,693,828	419,400	3,113,228	2,522,248	590,980	1754.5
Example C	1320	2,672,970	106,200	2,779,170	2,178,901	600,269	1901

Greater Coke Reduction — Humidification of the blast to the extent of 21 grains of H_2O per cu ft of air, when reducing self-fluxing sinter, results in a coke consumption of about 1275 lb per net ton of iron with a capacity of 1044 tons in an 18-ft diam stack. If this steam is replaced with 3330 cu ft of 1080 Btu natural gas, the coke consumption will be reduced to 1000 lb per net ton of iron.

And with the same daily capacity, the blast temperature is increased from 700°C (1290°F) to 820°C (1508°F). Oxygen enrichment of the blast is not required in this case. But if the blast were enriched at the rate of 100 lb of commercial oxygen per net ton of iron, the production rate would increase by 6 pct.

Greater Usage — In locations where there is an abundant supply of low cost natural gas, it may be possible to lower the coke charge to 400 lb or less. In such an instance, the natural gas requirement would be about 10,000 cu ft on self-fluxing sinter with 53 pct Fe.

It would be advantageous to use a gas reformer in this case to produce CO-H-N gas from natural gas and air. This gas would enter the hearth of the furnace at 1250°C (2282°F) with 442 lb of oxygen for combustion. For such an operation, coarse coke, preferably slow-burning, similar to foundry coke, should be used.

The use of oxygen for combustion not only permits a maximum amount of high-temperature heat, resulting in economical use of fuel, but an increase in furnace capacity, 50 pct or more over all-coke practice.

More Proof—Example A in the table represents the operation of a 1000-ton blast furnace with 1275 lb of coke and a blast temperature of 700°C (1292°F) with 21 grains of H_2O per cu ft. Example B shows a coke consumption of 1000 lb with 3330 cu ft of natural gas, 820°C blast temperature and oxygen enrichment of 100 lb per net ton of pig iron. Example C shows a coke consumption of 400 lb with 10,000 cu ft of natural gas reformed with air at 1250°C using 442 lb of oxygen per ton of iron for combustion reactions.

In these examples, the same amount of heat is supplied above the critical temperature, which is taken as 1500°C. The stack temperature remains the same while adequate reducing capacity is provided in the furnace gas.

The examples given may be regarded as typical applications of the use of natural gas, coke-oven gas, or other hydrocarbon fuels for replacing a portion of the coke in the blast furnace. At the same time the reducing capacity and hearth heat are maintained. Also the furnace capacity per sq ft of hearth area is increased.

Summing Up—Natural gas can be used to advantage to supply additional reducing agent to a furnace, both increasing the capacity and providing a convenient substitute for coke. As the amount of coke required per ton of iron decreases, there is a reduction in the sulphur and ash entering the furnace.

This results in a reduction in the amount of slag produced and eases the removal of sulphur from the metal. Also, there is an increase in the quantity of ore in the furnace and in the length of time it remains in the furnace, both factors favoring the heating and reduction operation.

Streamlined Card System Speeds Engineering Changes

Telescoping lead time to bring design improvements into production with little wasted motion is vital for military hardware.

Chrysler Missile has had to meet this and many other typical problems of job-lot plants. Organization and punched-card handling of engineering information help point the way.

By R. H. Eshelman
Engineering Editor

▪ The missile industry must keep accurate track of the thousands of small parts and components so vital in its operation. Complete engineering information must not only be reliable but readily available.

In order to speed handling of such information Chrysler Missile has designed a streamlined and simplified system to lessen some of the old headaches. Electronic data processing — punched cards and microfilm—is one of the basic techniques now in use at Chrysler.

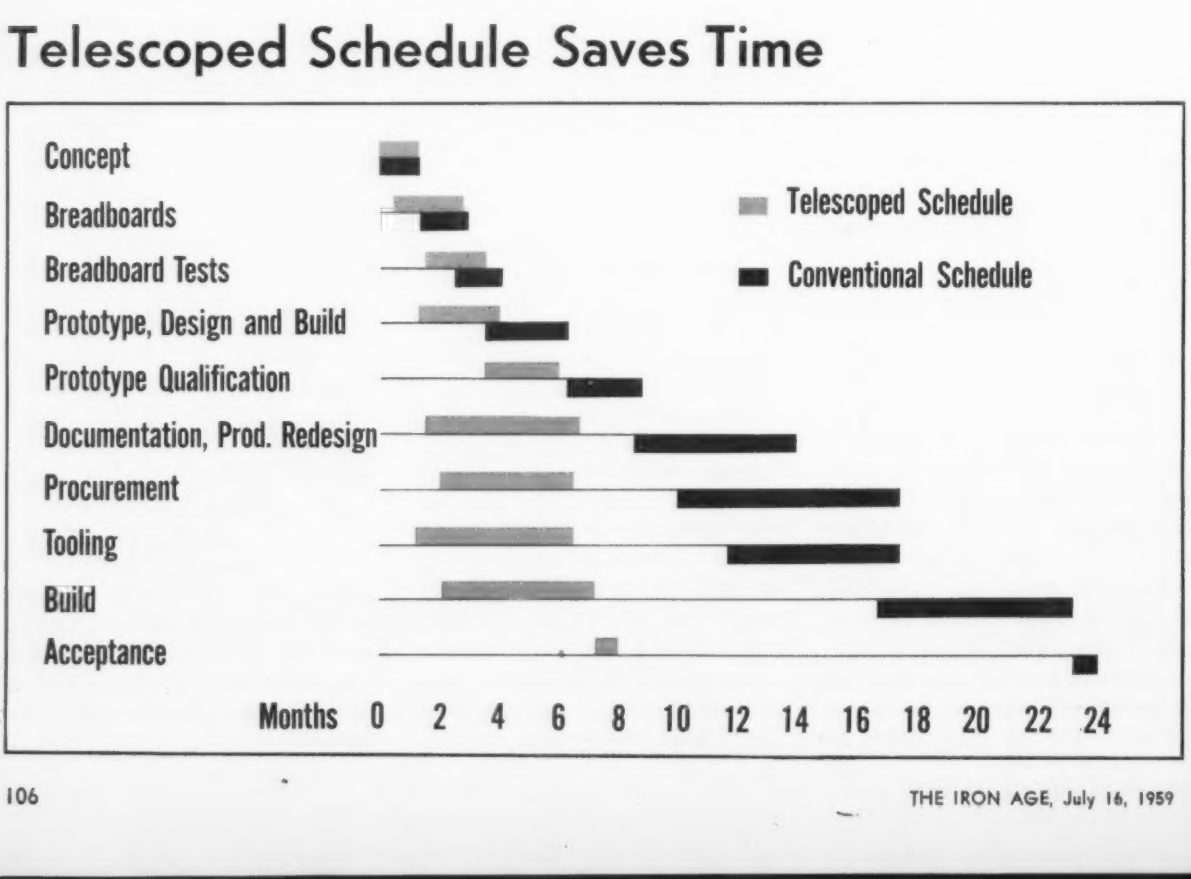
Cuts Lead Time—This system is not unique, of course. By using such modern methods, however, this plant has developed a reputation in the missile field for short lead time and product reliability.

As drawings are released, they're photographed on microfilm. One of the film positives clips into an aperture on a master punched card. This deck of cards provides a record of engineering information. From it, engineering prints up-to-date parts lists or blueprints for manufacturing, purchasing, suppliers, associated government offices, etc.

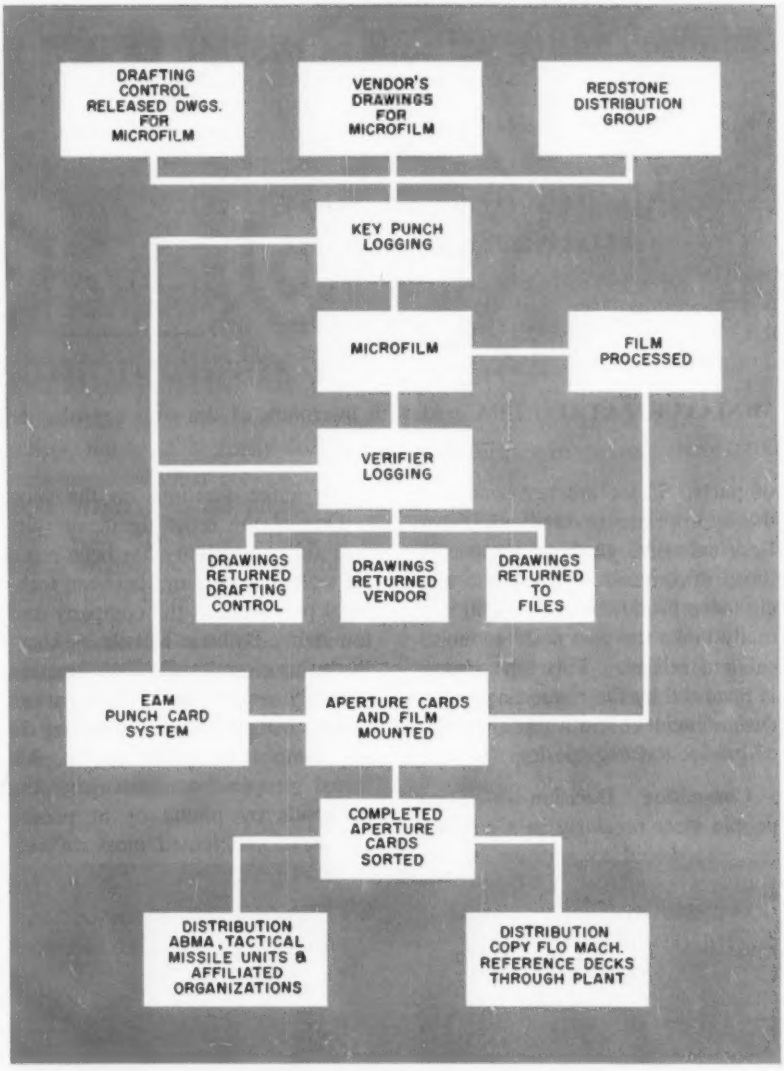
Less Complicated — The system has many advantages. It eliminates the constant battle for original drawings between engineers and the reproduction group. Changes go through much faster because there's no clerical tie-up. And it's easier to keep parts lists and blueprints up-to-date. The punched-card system reproduces lists faster and more accurately than previous methods.

The danger of losing irreplaceable engineering information from the original drawing is virtually eliminated. There's a tidy savings too in repro costs. It's no longer necessary to maintain extra copies of blueprints. Prints can be run rapidly when needed. For quick reference a microfilm reader fills the bill. And there's less trouble with obsolete prints being distributed by error.

Telescoped Schedule Saves Time



Work Flows in High Gear


DRAFTING CONTROL RELEASED DWGS. FOR MICROFILM
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Telescope Procedure—Release of information to manufacturing is custom tailored to the needs of the program. In early stages it's likely to be simple. Once the scope of the job is recognized, a project engineer is appointed for each particular item or piece of equipment.

As design information becomes available it is cranked into the system. Particularly fast action is taken on long-lead items. Outline specifications or information for preliminary tooling is released on signatures of the design engineer and the project engineer. Often design and prototype built stages will parallel research and development.

Changes to such equipment may consist merely of issuing the proper piece of paper approved by the responsible engineer. With the punched card system clerical handling is reduced, as well as time consumed between changes and release of the information.

Piecemeal Release — Frequently the complete design is not known but fragments of it may be. L. B. Forman, Chief Design Engineer, explains, "In a field where developments are coming as rapidly as in this one, we cannot afford the luxury of completing the design, thoroughly testing it before we put it into production."

So they start the ball rolling with elements of the system as they become defined. This procedure calls for procuring, tooling and starting to build an item on the basis of piecemeal information. It's anticipated that a more complete engineering description will become available as needed. For example, procurement of a valve or relay can often be preselected by past experience before the complete design is formalized. Such items are released first.

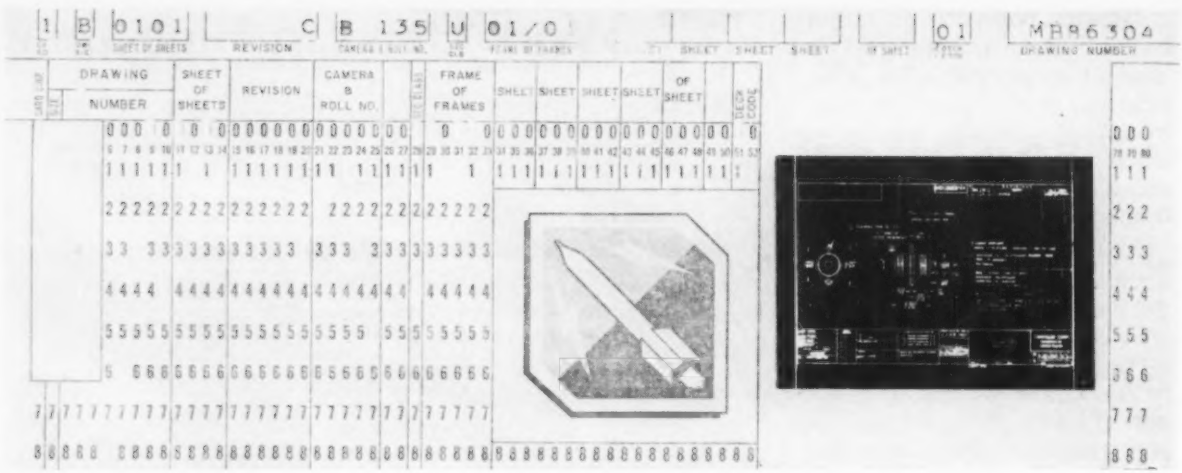
"Obviously there is a gamble in this," admits Forman. "It's possible that some of the equipment may not be used later on. However," he adds, "our experience shows that such a gamble is . . . well worthwhile because of the need for speed in the system."

Use Block Concept — Manufacture in this field has been aptly labeled "serial" rather than mass production. So this firm designs and builds under a block concept, the idea being that a certain specified number of pieces of equipment (a block) will be built alike. Every effort is made to keep all units identical within a given block.

This simplifies engineering records, furnishing field operations information and checking performance. The system also permits changes to be put into effect at the beginning of each block of production resulting in greater flexibility.

Quick - Change Action — As design becomes well-defined and formalized by approvals, releases are made on a more formal basis. Complete drawings are issued to describe each piece of equipment, even if it varies slightly from previous parts. The major problem not only concerns initial definition, but the variations as well. These changes come from experience and performance in the field, improvements originating from research and development, manufacturing, procurement and sub-contractors, and other participating agencies.

Some changes are of major nature, affecting operation and service manuals, and the interchangeability



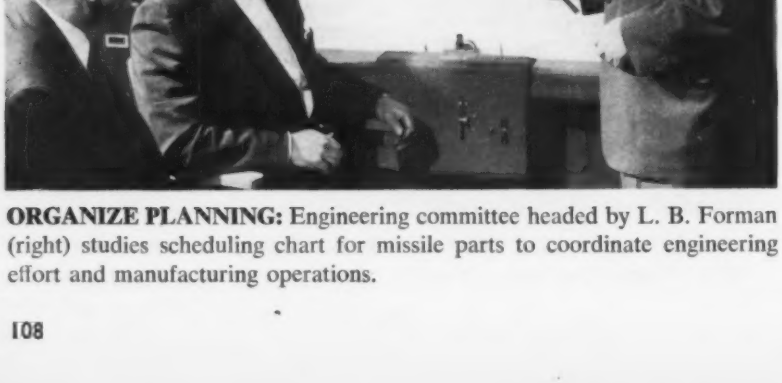
MINIATURIZATION: IBM card with microfilm of drawing capsules engineering data and speeds paperwork.

of parts. These are reviewed with the appropriate government offices. Less extensive changes are usually those introduced to make the article more producible. This will normally make the part more economical and reliable. This type change is reviewed by the requesting group, design engineer and a representative of production engineering.

Committee Decision — These people meet regularly in a committee empowered to approve or disapprove these changes. Experience shows this committee, advised of the requests in advance, can generally make decisions on the spot.

One of the most significant factors aiding flexibility has been regular technical meetings between technical personnel of the company and the Army Ballistic Missile Agency. With this close liaison they function virtually as a single organization. When changes are proposed they do not come as a sudden shock. Affected people have discussed the proposals by phone or in person and have anticipated most difficulties.

Liaison Group — Another factor in telescoping engineering and manufacturing time is close cooperation between company engineering and manufacturing activities. Production engineering is the liaison group. These engineers, experienced in both design and manufacturing, work closely with design and government agencies. They know what can and can't be done in the shop; they advise and recommend priorities to engineering. In this manner they assure practical designs from the manufacturing viewpoint.



ORGANIZE PLANNING: Engineering committee headed by L. B. Forman (right) studies scheduling chart for missile parts to coordinate engineering effort and manufacturing operations.

In Shop Too—Production engineering releases information used by manufacturing engineering and production control for procurement of parts and other shop operations groups. They are in a position to know what has and has not been released. They coordinate the schedule in meetings with tooling, procurement and other operations groups. In these meetings production engineers provide descriptions of jobs to be released and expected changes.

Production control originates the procurement of purchased items. They also order fabrication of parts in the shop. They work with scheduling groups to coordinate purchases and parts manufacture. Here again the mechanized card records help. Basic cards are used to issue schedules to the shop for fabrication, parts lists and engineering releases for these activities.

Dolomite Machine Throws Sand

Unit Makes Bottom in Billet Reheat Furnaces

Dolomite machines, converted to sand slingers, outdo hand methods of shoveling.

Use in billet reheat furnaces steps up efficiency in making bottom.

▪ An old standby in openhearth-bottom maintenance, the dolomite-throwing machine, has taken on an added job. For now the unit is making itself just as useful in high-temperature billet reheat furnaces.

The only wrinkle to the new work is that the machine isn't throwing dolomite. Since the billet reheat furnaces at the A. M. Byers Co. plant in Ambridge, Pa., need a 4-in. bed for the hot billets to bask in, the unit now throws silica sand.

Engineers at the Ambridge plant claim success with the new setup. For one thing, it has increased bottom-making efficiency by about 50 pct. And it replaces the old method of shoveling the sand in by hand. The men who shoveled the sand were far too close to the furnace heat for comfort.

Mobile and Fast — Every eight hours, each of the company's eight furnaces requires a built-up bottom. The mobile dolomite machine, now a converted sand thrower, arrives in front of the furnace ready for action. Throwing at a rate of 1200 lb of sand per minute, the machine far exceeds speeds obtained by the previous method.

The 120-cu ft capacity unit was designed and built by Blaw-Knox Co., Pittsburgh. Although its operation is quite simple, the heater on duty should be there to control the flow and direction of feed while making bottom.

The self-driven machine is said to be the first of its type to be used as a sand slinger. Mounted on rubber wheels, the unit is equipped with a 120-cu ft capacity sand bin and a sand-throwing assembly.

The Sand's Path—The assembly is made up of three pulleys and a grooved wheel over which a continuous rubber-covered belt runs. The sand flows from the bin to a feed hopper in the throwing device.

Directed to a grooved throwing wheel, the sand is finally fed to a high-speed belt that projects a compact stream onto the furnace bottom. Vane-type pumps driven by a diesel engine furnish the hydraulic power for the machine.

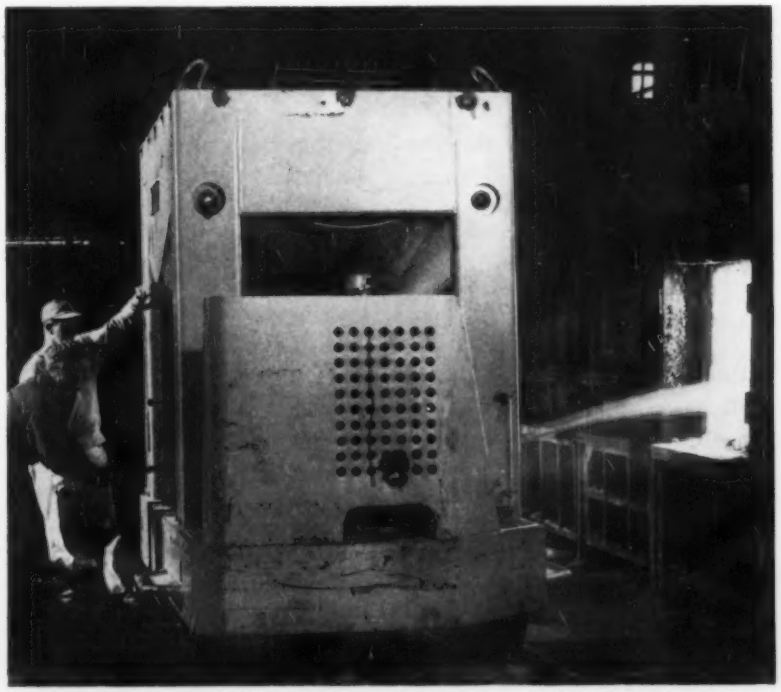
Someone to Gage—The heater in charge of the furnaces inspects the bottoms to see which areas need to be reinforced. He can then control the stream and trajectory of the sand by adjusting the motor speed.

He can also zero in the stream's accuracy from an operating handle. And by adjusting the bin gate he can control the amount of sand fed into the furnaces.

This dolomite machine is being used on eight oil-fired furnaces at Ambridge. Each one is 12 by 27 ft in size. Singly capable of heating up to 10 tons of wrought iron billets every hour, the temperatures within each furnace range from about 2400 to 2500°F.

Billets Processed—The furnaces are used to heat from 3¾ to 4¾-in. square billets, 4 ft long. After being heated, the billets are conveyed to a 10-in. merchant mill.

Here they are rolled into round or square bars, or into skelp. The skelp is later formed into butt or lap-weld tubing at the company's Pittsburgh plant.



SAND THROWER: Dolomite machine propels stream of silica sand in making bottom. Sand enters open door of high-temperature billet furnace.

JOINS AND FORMS PIVOT: In first photo, eyelet is ready for setting. Operator merely positions model freight car parts, then cycles machine with floor switch to produce clinched assembly in second photo.

How Eyelets Aid Metalworking

Eyelets are inexpensive; automatic setting machines make for high production rates.

Together, they're now slashing costs of many light assemblies.

▪ Long a standard item in shoes and some types of clothing, eyelets are gaining note these days in the metalworking and plastics industries as well. The reason: low installed cost.

To begin with, an eyelet is one of the lowest priced fasteners. But this alone is not enough to recommend it. Installed cost is the deciding factor in choosing a method of assembly. Eyelets can be fed automatically and set at very high rates. Tooling is inexpensive, and automatic eyeleting machines stand with today's lowest priced high production equipment.

Among the Strongest — On a weight-for-weight basis, a hollow cylinder is the strongest structure known—and an eyelet is basically a hollow cylinder with a head. A solid member in tension or shear is stronger; but an eyelet is more than strong enough for many uses in thin sheet or light metal.

If the interior of the product must be sealed or leakproof, an eyelet won't do. But here, again, this isn't a usual requirement; and few fasteners produce sealed assemblies without special design and some type of sealant.

Thus, the benefits outweigh the drawbacks in many industrial uses. As a result, eyelets are finding wide acceptance for assembly of toys, hardware, electrical and electronic gear, light sheet metal products, lighting fixtures, and literally hundreds of varied products.

Other Advantages — Low installed cost isn't the only spur to growing use of eyelets in metalworking.

One factor is the ability of an eyelet to punch its own hole in some soft materials and thin stock. Another is its ability to join dissimilar metals and nonmetallics in many combinations. And an eyelet can be clinched tightly against the work, or loosely so that the fastener can function as a pivot.

Eyelets come in a wide range of materials and finishes, including steel, aluminum, brass and some of the nickel-chromium alloys; they're electroplated, anodized and given other electrolytic or organic finishes. And finally, they can be clinched in confined areas.

Limits on Size—Eyelets aren't large; the usual size range in brass is from 0.047 to 0.500 in. in diam and from 0.062 to 0.437 in. long. Size limits depend greatly on the

material of which the eyelet is made.

As for tolerances, 0.002 in. in diam and ±0.005 in. in length are the general limits for high production. This range, plus the fact that the work is accurately located by the tooling before an eyelet is clinched, makes eyelets suitable for all but the highest precision jobs.

Typical of what can be done with eyelets is the experience of A. C. Gilbert Co., New Haven, Conn., in using them on model trains and toys.

Gilbert's production engineers became interested in eyelets because of setting ease and low cost. Starting with one eyelet machine made by the United Shoe Machinery Corp., Boston, Mass., Gilbert now has 20 United models in operation.

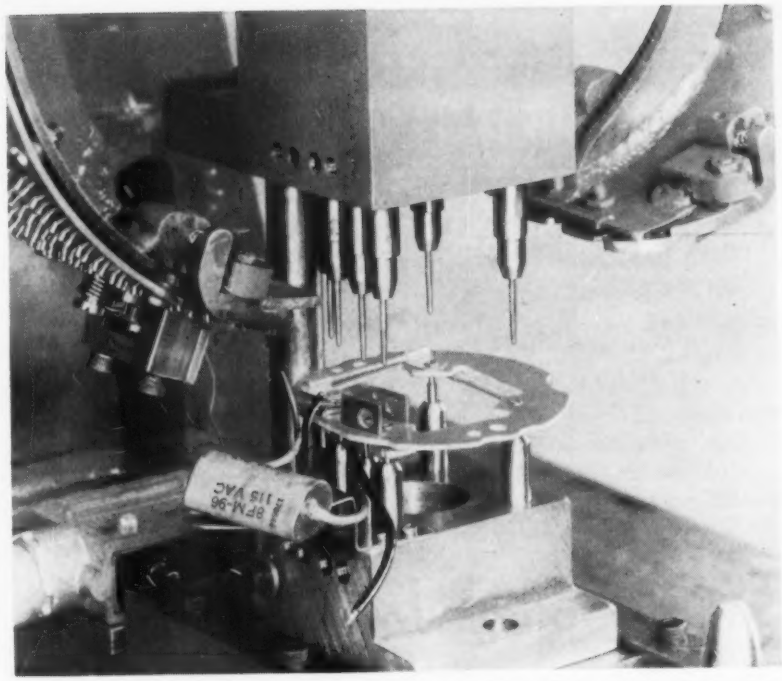
Effects Big Savings—On two of the first production runs, eyeleting saved $1760 and $2277 respectively. This includes cost of conversion and making new molds.

In one case, Gilbert attaches four small ladders to a model locomotive. With the old methods, it was necessary to drill eight holes, assemble four ladders and attach them by hand. Cost per thousand ran $35.57. of which $26.30 was labor and $9.27 material.

For eyelet assembly, a mold with four holes (one on each corner of the chassis) was created, and a strengthening top rib added to make the ladder rigid. The cost dropped to $13.20 per thousand—$11.60 for labor and $1.60 for material—a saving of $23.37.

A similar analysis was made on another job: attaching car trucks to box car base. Cost by the old methods was $10.35 per M ($4.58 labor, $5.78 material). Eyelets cut costs to $4.17 per thousand ($3.23 labor and $0.94 material), for a saving of $6.19 per thousand.

While eyelets aren't the answer to every man's assembly problem, these advantages are important. That's why industry is rediscovering this fastening technique and adapting it to many new uses.



SIX AT A TIME: High-speed automatic assembly of six standard-size eyelets at one time is effected by special raceways which feed eyelets.

SIMPLE AND SECURE: Another special machine designed by United Shoe Machinery Corp. automatically feeds and sets two rivets at a time. It fastens two bells to realistic toy telephone made by Gong Bell Mfg. Co.

New Mastic Seals Curtain Walls

A curtain wall is no better than its joints.

Here's a new sealer that cures one of the biggest headaches in design and erection of panel structures.

▪ Answers to many of the joint-sealing problems in curtain-wall construction are provided in a new sealant made by Atlantic Laboratories of Delaware, Inc., Wilmington, Del.

The low-cost mastic is based on Du Pont's Hypalon synthetic rubber—chlorosulphonated polyethylene—which until now has come only in the form of high-priced extrusions.

Long Pot Life—The Grayguard Caulking Compound, as it is called, is a one-part material, ready to use from the pail. Besides doing away with tedious premixing or activating, it offers unlimited working life. This in turn precludes material loss due to premature setup, which can be a real factor in costs.

Once applied, it becomes tack-free in about 30 hours, then cures to a tightly bonded resilient seal.

Surface preparation is reduced to simple cleanup. The new compound can be applied to bare or coated surfaces, but doesn't require priming to effect a lasting seal.

No Special Tools—The Grayguard material is applied with an ordinary putty knife or caulking gun. Since it cleans off easily with common solvents (toluene, xylene and the like), there's no need for guns with removable plastic liners. This also simplifies the problem of cleaning up oversmears. And, because it eliminates special precautions or masking to protect the work, the job is finished faster.

An important feature of the new sealant is the fact that it stays where it's put—doesn't slump or sag even in wide, deep vertical joints. It works well in hot or cold weather, with no tendency either to run, become sluggish or set up too soon.

Applied cost is low: about half that of the widely used polysulphide mastics.

Durable Seal — The Grayguard compound ties firmly to all materials of construction. It retains its rubber-like qualities through a temperature range of —40° to 250°F.

Accelerated aging tests indicate a potential service life running upwards of 20 years. In the seven years since its introduction, Hypalon has proved outstanding in resistance to strong acids, many other chemicals, water, sunlight, extremes of climate and weather, and severe abrasion or deformation.

Sealer Solves Joint Problems

Base	Hypalon synthetic rubber
Consistency	soft, putty-like (becomes rubber-like on curing)
Solids content, pct	85 to 90
Temperature range (continuous service), °F	—40 to 250
Shrinkage, aged 60 days at room temperature, pct	2 to 5
Sagging or flowing, placed vertically*	negligible
Tack-free skin time (at room temp.), hours	30
Hardness, Shore A**	25
Tensile strength, psi**	175
Elongation, pct**	250
Elongation of weathered elastomer, pct* **	180
Adhesion (aged 30 days at 122°F), psi**	
steel to steel	88
stainless to stainless	55
aluminum to aluminum	89
glass to glass	44
wood to wood	43
marble to marble	38
Material cost, ¼ x ¼ in. bead, ¢/lin. ft.	about 3.0

General:

Non-staining, non-corrosive, available in any desired color.
Has complete resistance to ozone, and to migration of solvents and plasticizers; excellent resistance to water, sun, chemicals.
Self-extinguishing, doesn't support combustion.
One-part system, self-curing, no need for premixing.

* Tested according to Tremco specifications for elastomeric sealers for curtain-wall and glazing applications.
** Upper limit.

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COMPRESSION
USED with copper, brass, aluminum and plastic tubing. PRESSURE RATINGS up to 2000 p.s.i. **Sizes: ⅛" to ¾".** Listed by U.L.; approved by A.G.A. Meets specs of S.A.E. Hydraulic Tube Fittings Standards and A.S.A. and A.S.M.E. codes for instruments and control piping.

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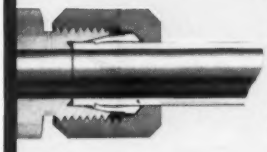
No flaring, soldering, welding—insert tube and tighten nut. USED with copper, brass, aluminum and plastic tubing. PRESSURE RATINGS up to 2000 p.s.i. **Sizes: ⅛" to ¾".**

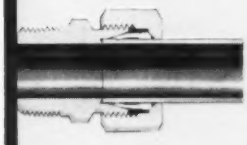
INVERTED FLARE
USED with copper, brass, aluminum, steel, Bundyweld and plastic tubing. PRESSURE RATINGS up to 3000 p.s.i. **Sizes: ⅛" to ¾".** Listed by U.L. Meets specs of S.A.E. Hydraulic Tube Fittings and A.S.A. and A.S.M.E. codes for instruments and control piping.

PIPE
USED with brass or steel pipe. PRESSURE RATING: up to 5000 p.s.i. **Sizes: to 2".** Meets specifications of S.A.E. TPHL Fittings Committee.

FORGED STEEL FITTINGS



"7000" SERIES ERMETO®
U.L. listed. Meets J.I.C. standards. S.A.E. approved "O" Ring boss design. Dryseal pipe thread. Needs no flaring. Available in either carbon or stainless steel. Carbon steel fittings have "Weathercoat" or cadmium-plate finish. PRESSURE RATINGS: up to 10,000 p.s.i. **Size Ranges—⅛" through 2".**

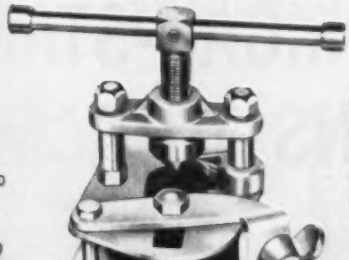


"8000" SERIES ERMETO®
Listed by U.L. for use with hazardous liquids, fuel equipment, refrigeration and gas; meets specs of S.A.E. and J.I.C. hydraulic tube fitting standards. Supplied as standard in cadmium-plated carbon steel and in stainless steel. Requires no flaring. PRESSURE RATINGS: up to 10,000 p.s.i. **Size Range—⅛" through 2".**

FLARE-TWIN—(2-pc. or 3-pc.)
37° FLARE STEEL TUBE FITTINGS
Listed by U.L. S.A.E. and J.I.C. approved. Used with J.I.C. and other soft steel tubing; also with copper, aluminum, and fully annealed stainless steel tubing. Meets S.A.E. standards for straight thread boss mounting. PRESSURE RATINGS up to 10,000 p.s.i. **Sizes: ⅛" through 2".**

FLARE-TWIN
Made in 3-piece and 2-piece assemblies. 2-piece type offers price advantage. "Weathercote" or cadmium-plate finish.

FAST! EASY! ACCURATE TUBE WORKING TOOLS

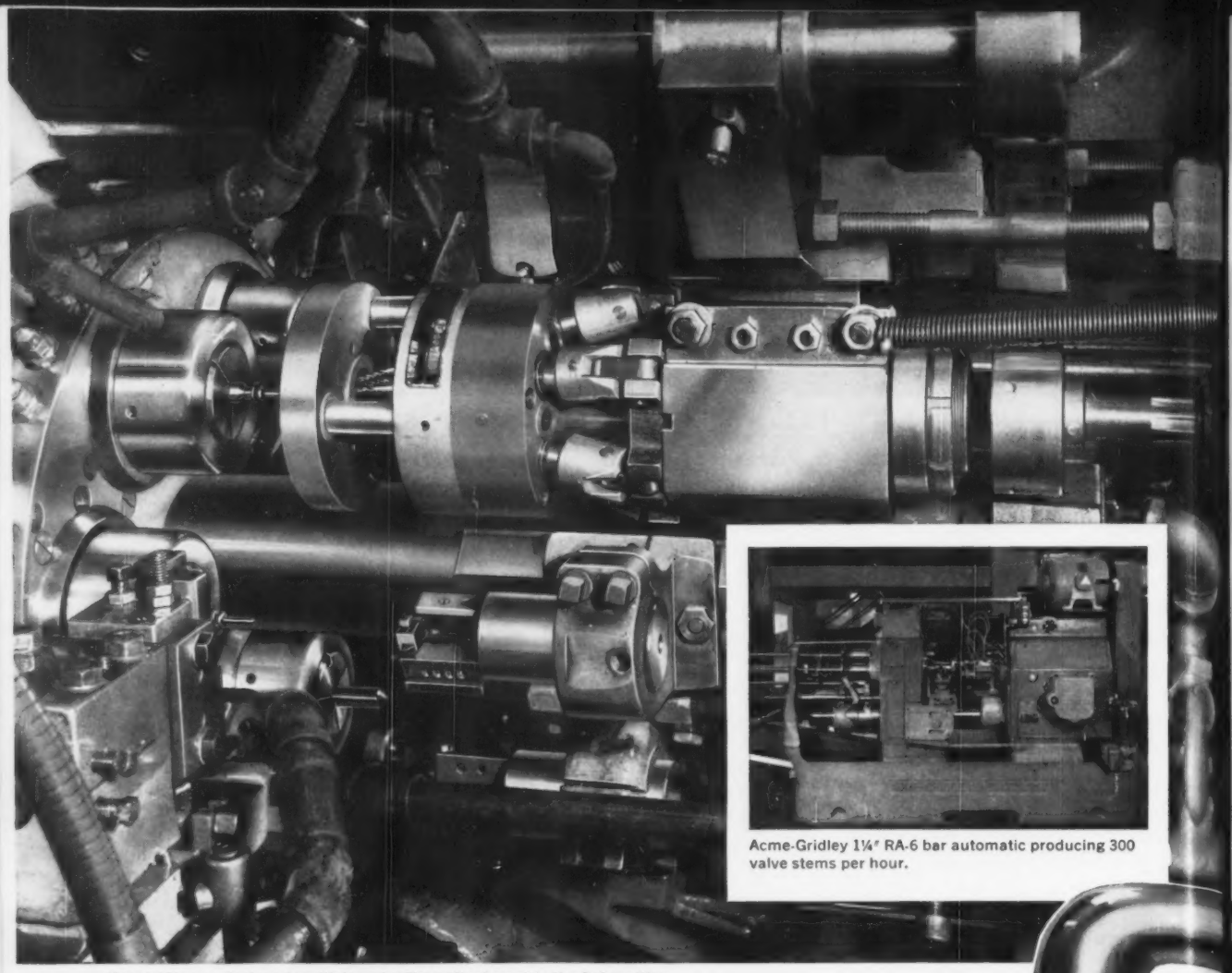


New rotary flaring tool for perfect tube flaring. Fast . . . one piece construction. Easier . . . "Dial - Matic" tube size selection. Accurate...tube stop automatically controls flaring diameter. Compact . . . easy to store. Available with burnishing attachment.

Spring-Type Bender | Mechanical Bender | Tube Cutter | Bar-Type Flaring | Tube Swaging | Automatic Flaring Rotary

THE WEATHERHEAD COMPANY

FORT WAYNE DIVISION • Dept. IA-7, 128 West Washington Blvd.
Fort Wayne, Indiana



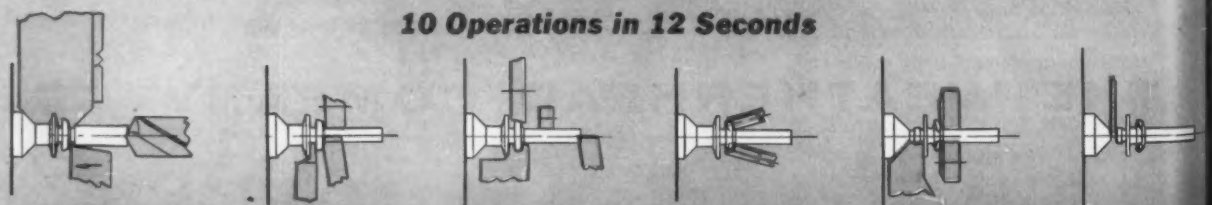
Acme-Gridley 1¼" RA-6 bar automatic producing 300 valve stems per hour.

Special Namco-designed multiple end milling attachment in the 3rd position.

When Tolerances and Finish Looked Economically Impossible

AMERICAN-STANDARD TURNS TO ACME-GRIDLEY...

10 Operations in 12 Seconds



6th position
Rough form rear —rough turn stem —spot drill

1st position
Finish turn stem face large diameter

2nd position
Shave—face and chamfer stem end

3rd position
Stop spindle— mill six slots

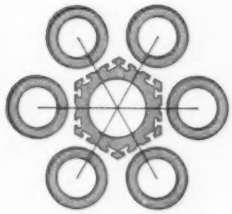
4th position
Start spindle— burnish stem— form back end

5th position
Cutoff

COMPLETED IN A SINGLE SETUP . . . this hyseal valve stem is a vital component in American-Standard's single-lever mixing faucet. Production by other processes would have meant a two-piece assembly. It would have been economically impossible to meet the high standard of quality and exacting tolerances maintained on this company's products.

Ten operations, including multiple end milling of six half-holes on a 15° angle, were performed on this 303 stainless steel piece in 12 seconds. Rigid specifications required a 20 microinch finish and limits of .002 t.i.r. between seating surface and end of valve stem.

Advanced spindle stopping design and the inherently accurate indexing of Acme-Gridleys, assure proper alignment of the work with the standard and special tool attachments. This, together with wide open tooling zones and independently operated tool slides, helps assure the solution of "impossible" jobs at National Acme. Write or ask one of our representatives for the complete story on the industry's most modern approach to your cost reduction problems.

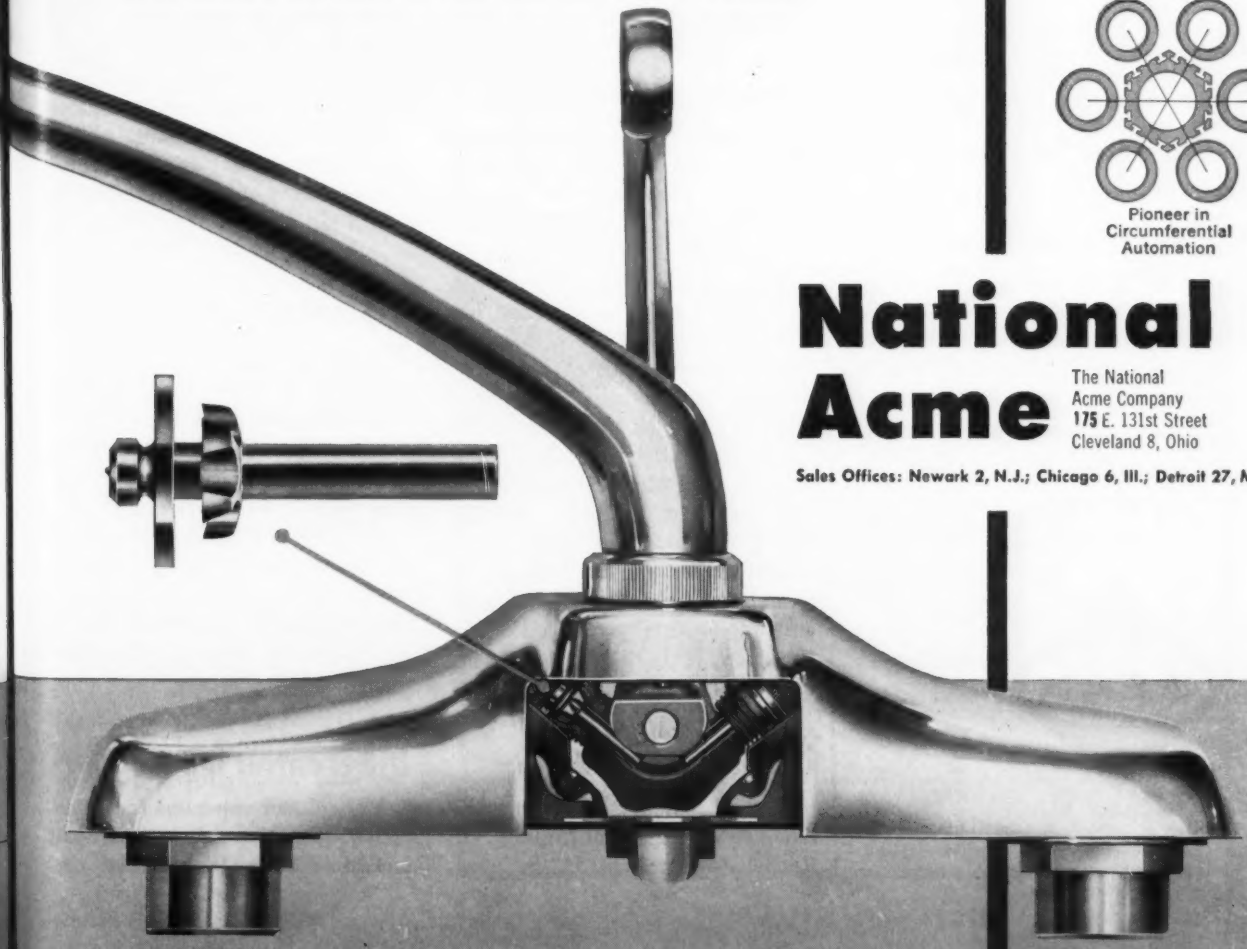


Pioneer in Circumferential Automation

National Acme

The National Acme Company
175 E. 131st Street
Cleveland 8, Ohio

Sales Offices: Newark 2, N.J.; Chicago 6, Ill.; Detroit 27, Mich.



Ductile iron fluid couplings to withstand high shock diesel service are cast in quantity. Their smoothness and accuracy save considerable machining time as a result of the unusual foundry methods of Morris Bean & Company, Yellow Springs 20, Ohio.

BEAN

aluminum
magnesium
ductile iron
foundries

New Patents In Metalworking

Direct Iron Reduction

Control method and apparatus for iron reduction process, J. W. Halley (assigned to Inland Steel Co., Chicago, Ill.), June 2, 1959. In the direct reduction of iron ore, heat input to the hearth zone is maintained constant, and the transfer rate of solids from reducing zone to hearth zone is variable with temperature at a control point responsive to the temperature of the molten metal in the hearth zone. No. 2,889,219.

Stainless Steel Alloy

Stainless steel alloy and method of forming, L. E. Fink and R. W. de Weese (assigned to Electric Steel Foundry Co., Portland, Ore.), June 2, 1959. Stainless steel alloy having an improved yield strength at 600° to 1200°F and good impact strength, weldability, machinability, and resistance to corrosion. Steel is combined in a molten bath with 17.25 to 18.25 pct Cr, 12 to 13 pct Ni, 0.034 pct C maximum, 2.25 to 3 pct Mo, 0.35 to 0.75 pct Si, 1 pct Mn maximum, and Cb and Ta 10 times the C content. The ferrite content of the bath is determined, and ferrite-formers and austenite-formers are added as needed to bring the ferrite content to 5 to 10 pct. No. 2,889,223.

Cooling Steel Strip

Method and apparatus for continuously cooling metal strips, G. H. Rendel (assigned to U. S. Steel Corp., a corporation of N.J.), June 9, 1959. Design for a temperature control device for use during heating or cooling of steel strip as it passes over a number of rolls, particularly adapted for use in the continuous annealing of steel strip. No. 2,890,037.

Vacuum Metalizing

Vacuum metalizing high tensile steel parts, G. W. Jenkins (assigned to Anadite, Inc., South Gate, Calif.), June 9, 1959. Method for producing aircraft parts or the like of high tensile steel coated with a non-corrosive metal, e.g., cadmium. Hydrogen embrittlement of the steel is prevented by this process. No. 2,890,135.

Open-Hearth Firing

Coke gas and tar firing of open hearths, J. H. Kelley and J. E. Eberhardt (assigned to Bethlehem Steel Co., a corporation of Pa.), June 23, 1959. Method of increasing production capacity of an open hearth furnace by shortening the time required for melting and refining a heat of steel therein. Several parallel streams of coke oven gas and tar are ignited in the furnace in the same vertical plane. No. 2,891,609.

Differential Quenching

Method and apparatus for differential quenching of heat treated metallic articles, W. H. Lenz (as-

signed to Caterpillar Tractor Co., Peoria, Ill.), June 16, 1959. Method of obtaining a desired hardness pattern by quenching an article with a sheet of quench fluid that has coexisting zones of fluid with different heat abstraction properties. Thus, heat can be abstracted more rapidly from thick portions of the article which contain the greatest amounts of heat. Cooling cracking and distortion are markedly reduced. No. 2,890,975.

Continuous Casting

Casting of metals, J. Savage and B. O. Smith (assigned to The British Iron & Steel Research Association, London, England), June 9, 1959. Apparatus for controlling the level of metal in a mold supplied from a tundish during continuous casting operations. No. 2,889,596.

Blast-Furnace Tuyere

Blast furnace tuyere, J. E. Eberhardt (assigned to Bethlehem Steel Co., a corporation of Pa.), June 23, 1959. Design of a water-cooled blast furnace tuyere which has improved circulation of water in its nose portion. Service life of this tuyere is longer than the life of tuyeres in use generally. No. 2,891,783.

Vacuum Annealing

Apparatus for annealing in a high vacuum, H. A. Steinherz and E. S. Candidus (assigned to National Research Corp., Cambridge, Mass.), June 16, 1959. Apparatus and method for vacuum annealing a strip of reactive metal. No. 2,890,878.

Granulating Disk

Granulating disk, L. Selig (assigned to Metallgesellschaft A.G., Frankfurt am Main, Germany), June 9, 1959. Design for an iron ore granulating disk for making large pellets within a close tolerance of diameter. The disk has high capacity. No. 2,889, 576.

"I vote for the H-25 PAYLOADER®"

"The new bucket breakout is very effective because it takes a bite that amounts to something," says Orlin Holm, Maintenance Foreman of Baker Manufacturing Co., Grey Iron Foundry, Evansville, Wisconsin.

"It also gives low load-carry position for better driver vision and faster, safer operation. Power-steering is also a great help in a crowded foundry such as ours. It gives the driver quicker, easier control and if a wheel hits something it doesn't throw him."

Baker's Model H-25 "PAYLOADER" unit is used both day and night. Daytimes it charges furnaces with iron, coke and lime and hauls out burned sand. At night it scoops up the sand from the pouring floor and feeds it to the cleaning-aerating unit.

No other tractor-shovel can give you so much carry capacity (2,500 lbs.) on so short a turning radius (6 ft.). Its power-shift transmission with 2 speed ranges each direction, torque converter drive and power-steer make it the easiest, safest operating machine for the job. Power transfer differential — another exclusive in its class — gives the Model H-25 better traction on loose or slippery footing.

Your Hough Distributor is ready with further facts about the new Model H-25.

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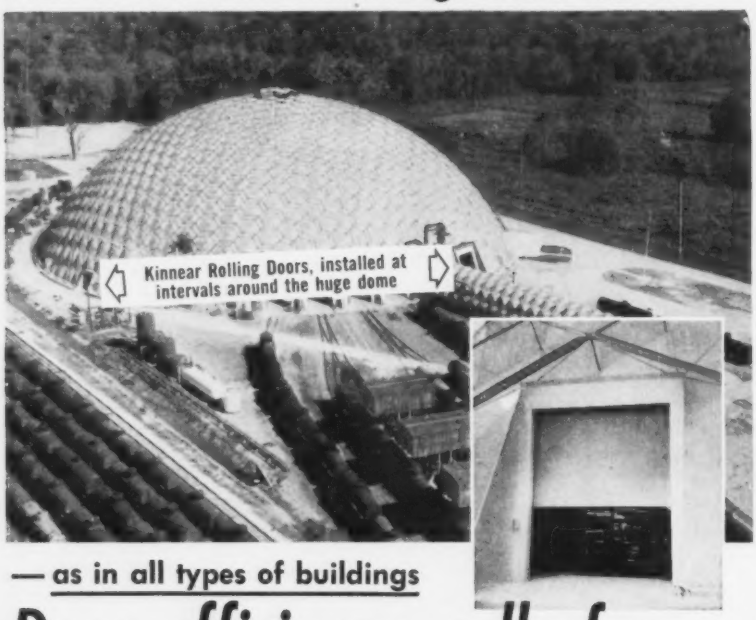
Even in this ultra-modern geodesic dome—



— as in all types of buildings

Door efficiency calls for Kinnear Rolling Doors

With no internal supports of any kind, *yet big enough to enclose a football field,* this giant geodesic dome houses a railroad car repair shop of the Union Tank Car Co., in Baton Rouge, La.

And here, as in all types of buildings, Kinnear Rolling Doors provide up-to-the-minute door efficiency.

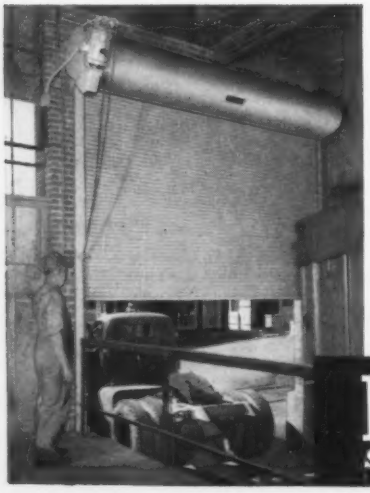
They open straight upward and clear the entire doorway, coiling compactly above the opening. Surrounding floor, wall and overhead space, *inside and outside the building* is always fully usable whether the doors are opened, closed, or in action. This promotes full use of hoist, crane, conveyor, and lift-truck equipment.

Their *continuous all-metal curtain* gives extra protection against intruders, vandals, troublemakers, wind, weather, and fire.

Every Kinnear Door is *Registered.* Full details of all parts are kept permanently in Kinnear's fireproof vaults. Parts are always replaceable. Your Kinnear doors will never be "orphans".

For maximum durability Kinnear's special hot-dip galvanizing coats the entire curtain with a full *1.25 oz. of pure zinc per square foot of metal* (ASTM standards).

Kinnear Rolling Doors are built any size, for old or new buildings, with motor, manual or mechanical operation. Write for information.



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KINNEAR ROLLING DOORS
Saving Ways in Doorways

FREE LITERATURE

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 121.

Tape Reliability

A study shows that the reliability of magnetic recording tape in instrumentation depends on the base material used. Initial findings of this study are detailed in a booklet. (E. I. du Pont de Nemours & Co.)

For free copy circle No. 1 on postcard p. 121

Variable-Speed Drives

A bulletin describes basic types in a line of variable-speed drives, modifications thereto, and suggested applications. Specifications and operating principles are included. (Sterling Electric Motors, Inc.)

For free copy circle No. 2 on postcard p. 121

Lift-Truck Wheel

A brochure describes a resilient but wear-resistant wheel for lift trucks. Long life and other advantages are stressed. (Disogrin Industries)

For free copy circle No. 3 on postcard p. 121

Room-Temp Cleaner

A metal cleaner which saves money in spray-washing machines by operating at room temperature is described in a folder. (Oakite Products, Inc.)

For free copy circle No. 4 on postcard p. 121

Non-Destructive Test

A two-page bulletin describes an apparatus used in non-destructive testing of solid materials by induced sonic vibrations. It can be used to measure transverse and torsional resonant frequencies and strengths and also to determine Young's Modulus of Elasticity. (Soiltest, Inc.)

For free copy circle No. 5 on postcard p. 121

Rapid-travel planer at Freitag's Plant.

New Facilities Make Salem-Brosius Prime Factor in Nuclear Energy Program

When Salem-Brosius' subsidiary, the Alloy Mfg. Corp., acquired R. H. Freitag Mfg. Co., Salem-Brosius became an integrated supplier of parts and components for the nuclear energy program. This additional 110,000 sq. ft. of precision machining capacity joins with Alloy's AEC and U.S. Navy approved fabricating capacity, permitting complete production control of nuclear contracts.

Freitag's product list is diversified, including plastic molding, rubber molding, stamping and die casting dies; jigs, fixtures, tools, gages and production—as well as precision—machining of components for industrial, commercial and consumer products of all kinds. This manufacturing capacity complements the complete engineering and erection service offered by Salem-Brosius on furnaces, plants, production lines and processing plants for steel, non-ferrous metals, glass and many other production industries.

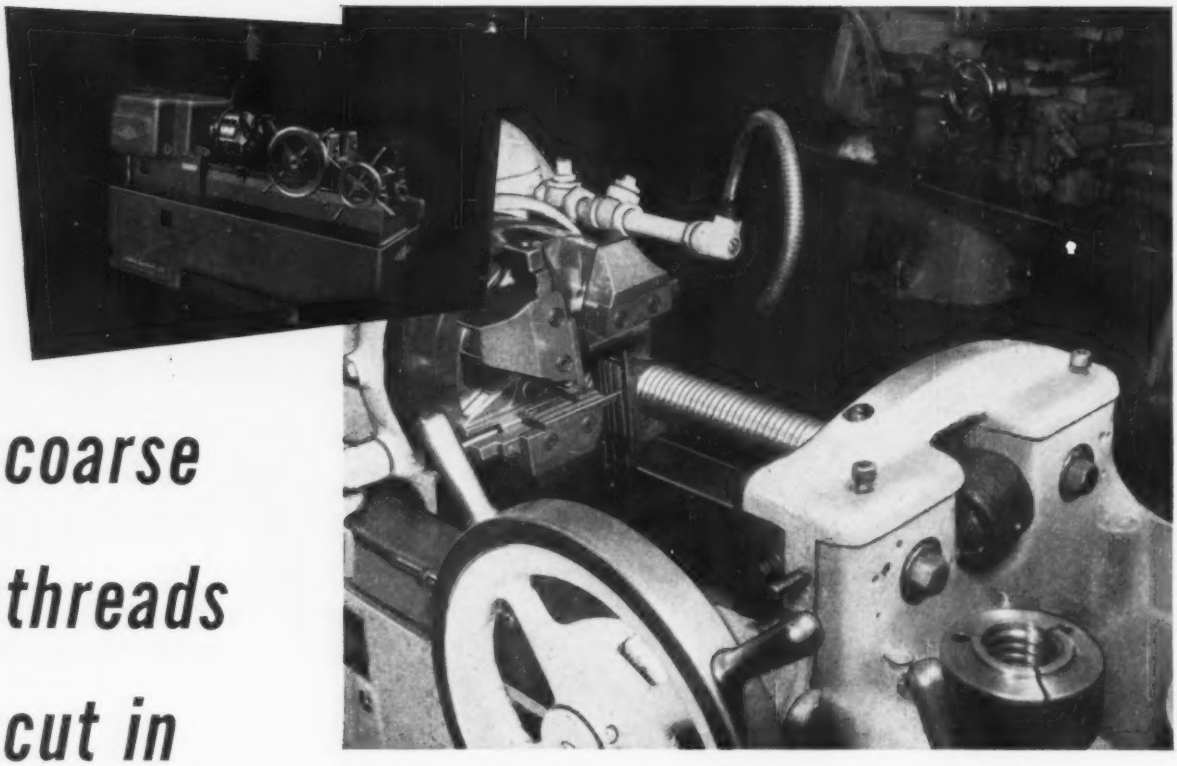
Here's what this can mean to you. If you have a product or part in the idea stage, Salem-Brosius will help you design it, do any or all precision fabricating, welding and machining to the closest acceptable tolerances and deliver or install the job with all responsibility for good workmanship and speed of delivery under one control.

If you see advantage in this, send your next inquiry to Salem-Brosius, Inc.

SALEM-BROSIUS, INC.

PITTSBURGH, PENNSYLVANIA

Salem Engineering Limited, Toronto, Ontario • Salem Engineering Co., Ltd., London & Milford, England • Salem-Brosius, S.A., Luxembourg • Salem-Brosius, S.A., Paris, France • Alloy Manufacturing Corp., Pittsburgh, Pennsylvania • R. H. Freitag Manufacturing Div., Akron, Ohio • General Ionics Corp., Pittsburgh, Pennsylvania.



coarse threads cut in one pass with LANDMACO *machines*

The cutting of large diameter Acme threads at the Iowa Manufacturing Co. of Cedar Rapids, Iowa, illustrates the heavy duty threading possible on LANDMACO Threading Machines.

1045 steel forgings of 20-29 Rockwell C are used in the production of adjusting screws for construction equipment. 2¼"—3 pitch Special Acme threads (EXTRA DEEP) are cut 10" long, with a .026 pitch diameter tolerance and a .001 per inch allowable lead error.

Cutting at a speed of 7.6 surface feet per minute, 12.5 pieces are completed per hour. This includes 100% gaging on the machine, using go-and-no-go gages. Despite the large amount of metal removal, at least 80 pieces are produced between chaser grinds.

This job is an excellent example how such heavy-duty threading can be done with the LANDMACO Machine. The 2½" Single Spindle Machine (½" to 2½" range) used here features heavy construction, hardened-and-ground ways, lead screw attachment, and is equipped with a rugged LANCO Tangential Chaser Die Head. Roughing-and-Finishing Centering Throat Chasers produce heavy cuts in one pass of excellent finish, eliminate the out-of-roundness common in long heavy workpieces, and provide low tool cost.

LANDMACO Machines offer precision and heavy duty threading within a range of #4 to 4" in diameter. For more detailed information, please send specifications when writing.

A62

LANDIS *Machine* COMPANY | **WAYNESBORO PENNSYLVANIA**

FREE LITERATURE

Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Thread-Rolling Machine

A booklet describes and illustrates a versatile thread-rolling machine, showing three distinct methods of operation and various applications. Its capacity is 3 in. (Landis Machine Co.)

For free copy circle No. 21 on postcard

Powered Coil Strapper

A four-page folder displays a power coil strapping machine with indexing table for strapping slit coils. It can handle a wide range of coil sizes. (Acme Steel Co.)

For free copy circle No. 22 on postcard

Fly Ash Removal

A four-page report shows how labor requirements were reduced and sanitary conditions improved at one plant by use of a pneumatic conveying system to handle fly ash. (Fuller Co.)

For free copy circle No. 23 on postcard

New Socket Screws

Extensive specification and application data for a new socket screw standard—the large-diameter-head socket-head cap screw—is provided in a four-page technical bulletin, and a line meeting the new standard is illustrated. (Standard Pressed Steel Co.)

For free copy circle No. 24 on postcard

Magnetic Pulleys

A new line of electromagnetic pulleys for removing tramp iron from belt-conveyed bulk materials is described in an eight-page bulletin, along with illustrations of applications and selection instructions. These pulleys are of two-coil design, and insure positive separation of ferrous materials at belt speeds up to 600 fpm. (Stearns Magnetic Products)

For free copy circle No. 25 on postcard

Aluminum Tool Plate

Properties, specifications, and availability of a grade of wrought aluminum tooling plate are described in a brochure. It has found many uses where maximum stability, flatness, workability, and ease of handling are required. (Reynolds Metals Co.)

For free copy circle No. 26 on postcard

Tough Bronze

A four-page bulletin describes an aluminum bronze alloy which successfully combats intergranular stress-corrosion cracking without weakening its general corrosion- and cavitation - erosion - resistance, workability, and high mechanical properties. Welding characteristics, forming, drawing, and machining procedures and physical properties are included. (Ampco Metal, Inc.)

For free copy circle No. 27 on postcard

Live Centers

A complete line of live centers with accuracy better than 0.0001 in. is described in a 12-page folder. (J & S Tool Co.)

For free copy circle No. 28 on postcard

Photoelectric Control

A full line of photoelectric controls for industrial counting, sorting, signaling, protecting, diverting, detecting, and limiting jobs, is presented in a 16-page bulletin. (General Electric Co.)

For free copy circle No. 29 on postcard

Bar Automatics

A bulletin describes and specifies redesigned 1⅝- and 2½-in.-capacity models of single-spindle bar automatics. The latter will handle jobs to 18-in. length. These versatile machines have a wide range of ap-

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FREE LITERATURE

plications on parts requiring turning and forming multiple diameters, shoulders, necks, tapers, and chamfers. (The Cleveland Automatic Machine Co.)

For free copy circle No. 30 on postcard

Indexing Mechanisms

High-speed, precision, roller-gear-drive indexing mechanisms for achieving intermittent and oscillating motions are specified in a 24-page catalog. Design information is included, as well as descriptions of index tables and rotary transfer machine bases. Units rated for speeds up to 2000 indexes a minute with prevision of 0.001 in. and zero backlash for 8000 to 20,000 hours' operation are included. (Ferguson Machine Corp. of Indiana)

For free copy circle No. 31 on postcard

Light Machine Tools

A "light-heavyweight" line of machine tools and accessories is described in a 48-page catalog. Included are radial, standard, and multiple-spindle drill presses, grinders, cutoff machines, band saws, and belt and disc surfacers. (Rockwell Mfg. Co., Walker-Turner Power Tool Div.)

For free copy circle No. 32 on postcard

Heavy-Duty Casters

A series of heavy-duty swivel-plate casters for industrial trucks and mobile equipment is described in a brochure. Five types of wheel in 6- and 8-in. diameters are included, with load capacities up to 1500 lb per caster. (Faultless Caster Corp.)

For free copy circle No. 33 on postcard

Indexing Table

Described in a four-page bulletin is an indexing table that performs angular indexing to any degree setting within ¼ second of arc in about 3 seconds. Typical uses include jig boring, precision surface grinding or scribing, gear checking, etc. Specifications on two models are included. (Michigan Tool Co.)

For free copy circle No. 34 on postcard

Chain Drives

Two handbooks outline installation, operation, and maintenance procedures for chain drives, and chain conveyors and elevators. Do's and don'ts are pointedly illustrated. (Chain Belt Co.)

For free copy circle No. 35 on postcard

Soundproof Booth

A wall-mounted acoustic chamber for telephones and intercom equipment in noisy locations is described in a brochure. (The Korfund Co., Inc.)

For free copy circle No. 36 on postcard

Grinding Information

Vol. 2, No. 1 of "Cutting Trends" features an article on the manufacture of chipper knives for the paper industry and includes questions and answers on grinding problems. (Simonds-Worden-White Co.)

For free copy circle No. 37 on postcard

Lift-Truck Indicators

The addition of a 60,000-lb-capacity model to a line of lift-truck weight indicators is described in a brochure. (Martin-Decker Corp.)

For free copy circle No. 38 on postcard

Copper Powder

Reprinted in booklet form, a technical paper describes in detail the production of electrolytic copper powder. The variables affecting product quality are treated. (American Metal Climax, Inc.)

For free copy circle No. 39 on postcard

Tube Welding

A data card provides information and recommendations concerning arc-welding of similar or dissimilar types of steel tubing. (Tubular Products Div., The Babcock & Wilcox Co.)

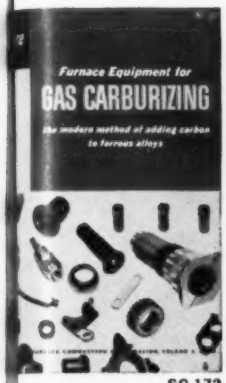
For free copy circle No. 40 on postcard

SC-181

WHAT'S NEW

IN HEAT TREATING?

this library of technical information is yours for the asking



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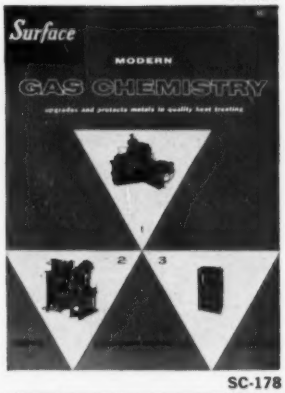

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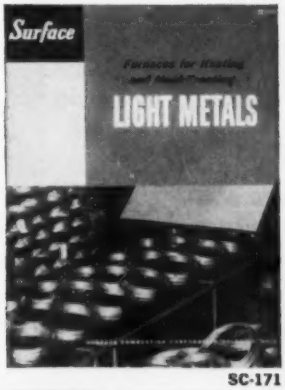

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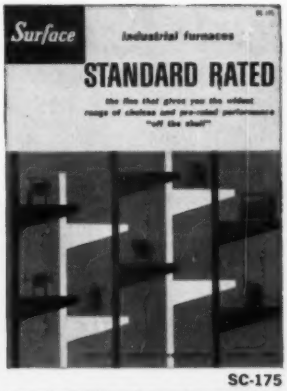
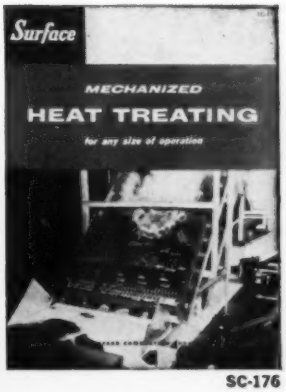


SC-175



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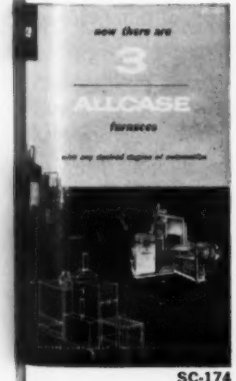
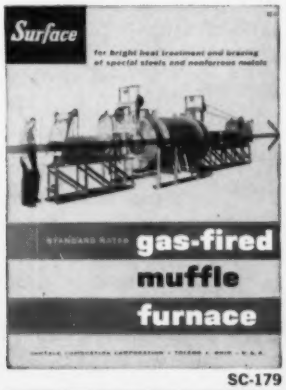


SC-174



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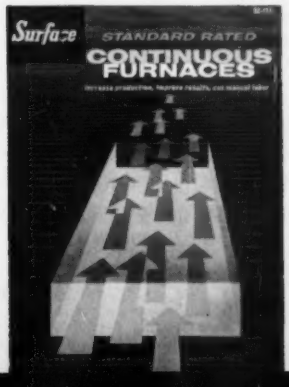
SC-173



SC-177

SURFACE COMBUSTION CORPORATION

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☐ *SC-172* ☐ *SC-174* ☐ *SC-176* ☐ *SC-178* ☐ *SC-181*

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company .....

street .....

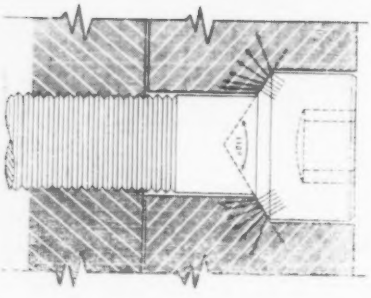
city ..... *zone* ..... *state* .....

New Materials and Components

Fire-Resistant Hydraulic Fluid for All Uses

A water-in-oil emulsion type hydraulic fluid, in addition to fire-resistant properties, has very high viscosity, excellent lubricity, and good thermal stability even at 150°F for long periods. It may be used wherever a fire-resistant fluid is needed, up to 2000 psi and 150°F with all types of pumps, except where manufacturer's instructions indicate otherwise. It will not flash or support combustion. (Sun Oil Co.)

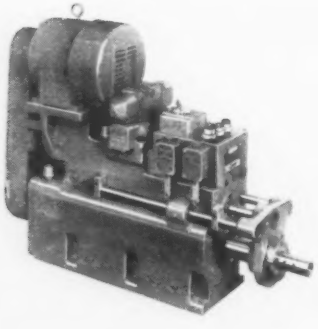
For more data circle No. 41 on postcard, p. 121



Taper Flange Improves Cap-Screw Efficiency

A taper flange in the head design of a new series of socket-head cap screws provides 16.66 pct more bearing surface, 14.28 pct less resultant compression, and a 28.57-pct improvement in working efficiency. The taper also creates a greater locking effect, requiring 12 to 23 pct more torque to release. Since the 118° angle matches that of a standard drill, any clearance hole can be easily counter-drilled to this angle, and the screw will seal against leakage of oils, liquids, and gases. Competitively priced, the screws are available in diameters from #4 through 1½ in. (Mac-it Parts Co.)

For more data circle No. 42 on postcard, p. 121



Low-Cost, Versatile Hydraulic Quill Unit

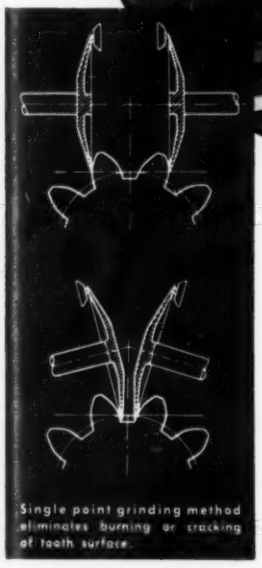
A self-contained quill-type hydraulic power unit features versatility of application and economy through use of standard components normally carried in stock. It rotates and feeds drills, reamers, counterbores, and spotfacers either singly or in multiple, and can perform limited boring and milling. Mountable at any angle, it can be operated manually or automatically. Spindle stroke is 12 in., including a feed stroke of 4 in., adjustable from 1.5 to 180 ipm. Spindle speed is up to 4560 rpm when driven by an 1800-rpm electric motor. Multiple units can operate from one reservoir. (F. Jos. Lamb Co.)

For more data circle No. 43 on postcard, p. 121

Expansion Nut Speeds Sheet-Metal Assembly

A quick-attaching expansion nut is designed for multi-purpose fastening uses where tapped holes are needed in thin sheet-metal assemblies. Available in six standard thread sizes, ½-20 to ⅜-24, it can be used in hand or production fastening operations. Special sizes can be supplied. This nut is a two-piece assembly—a nut held in a sheet-metal retainer having preformed tabs underneath. The tabs go into a pre-pierced square hole on the panel to which the fastener is to be attached. An easy-to-use assembly tool straightens arched bars on the ends of the retainer, locking it in place and permitting the nut to float for easy alignment. Thus the assembly can be attached to a panel

a new concept in GEAR TOOTH ACCURACY by phillie gear



Single point grinding method eliminates burning or cracking of tooth surface.

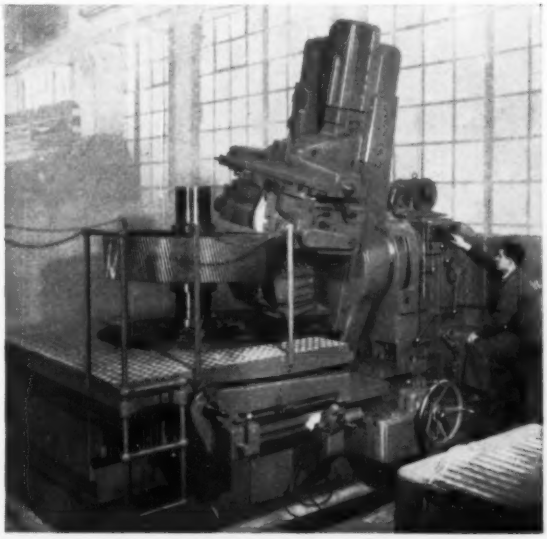
We have recently installed five of the latest Precision Grinding Machines to produce gears of absolute accuracy and surface finish . . . Gears so truly accurate that they will solve transmission problems never conquered before, because you secure technical and engineering advantages not previously obtainable.

Briefly, here are some of the advantages of Ultra Precision Gears ground on these machines:

Greatly Improved Profile Accuracy . . . 100% Interchangeability . . . Higher Operating Speeds . . . Increased Load Carrying Capacity . . . Longer Service Life . . . Space and Weight Savings . . . Reduced Noise and Reduced Vibration . . . Reduced Backlash . . . Greatly reduced tooth to tooth errors . . . This adds up to an improvement in your product.

Of course, we have only "touched the surface" in this advertisement, but if you get in touch with us, we will give you complete information about this Ultra Precision Gearing . . . No obligation.

Illustrated is one of our latest gear grinders for Spur and Helical Gears up to 72" diameter . . . ultra precision work table is accurate within 4.3 arc seconds total accumulative error. THIS MACHINE IS THE MOST ACCURATE LARGE GEAR GRINDER IN AMERICA.



Send for our latest 76 page "Gear Book" . . . it's practically a treatise on the subject of gears . . . Please use your business letterhead when requesting a copy.

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Hyde Park
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HYDE PARK
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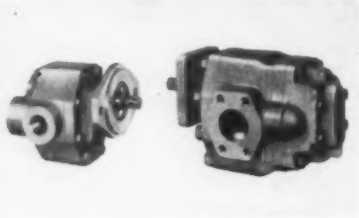
Rolls
Rolling Mill Equipment
Gray Iron Castings

DESIGN DIGEST

without need of support. The assembly tool can be operated manually, electrically, or pneumatically, and can be integrated into automated work. (The McLaughlin Co.)
For more data circle No. 44 on postcard, p. 121

Hydraulic Pumps

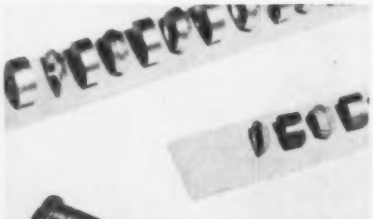
A line is available of lightweight aluminum hydraulic pumps, with capacities of 4 to 150 gpm, pressures to 2000 psi, and speeds to 3000 rpm. They are available in either direction of rotation. The



aluminum dissipates heat better, and makes for light weight to make servicing easier. Quiet running, they are low in cost. (Clark Equipment Co.)
For more data circle No. 45 on postcard, p. 121

Adjustable Bushings

Suggesting many uses, adjustable-wall-thickness bushings permit easy, exact adjustment of ID and OD. They consist of alternating male and female segments in a line. Compressing from the ends closes the males and opens the females, reducing the ID and increasing the OD, and resulting in a thicker bush-



ing wall, providing exact fit without expensive machining. Typical uses include: close-tolerance fasteners, salvage of oversize holes, pivot pins, structural steel fabrication, etc. The bushings are available in powdered metals, bronze, nylon, Teflon, stainless, and other materials. (Globe Bushing Corp.)
For more data circle No. 46 on postcard, p. 121

Dry Thrust Washers

Thrust washers have been developed for dry bearing operation. They consist of Teflon filled with a sintered porous bronze powder and backed with steel. Bore diameter is larger than journal diameter, to per-

mit a loose fit in the recess. A dowel hole is provided to prevent oscillation. During break-in a thin surface layer of lead-filled Teflon from the bearing surface deposits on the mating surface. After this, further friction causes more lead-filled Teflon to flow out onto the bronzed

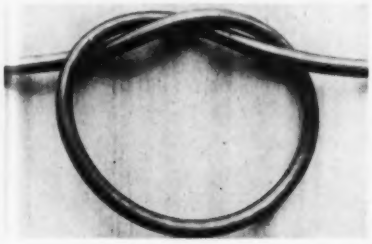
QUANTITY PRODUCTION OF GREY IRON CASTINGS
ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES
ESTABLISHED 1866
THE WHELAND COMPANY
CHATTANOOGA 2, TENN.

surface, creating a highly desirable bearing condition of two mated, lead-filled-Teflon self-healing surfaces. (United States Gasket Co.)

For more data circle No. 47 on postcard, p. 121

Welded Steel Tubing

Proved by extensive tests to be equal or superior to seamless carbon steel tubing, a new line of welded steel tubing is designed specifically for heat exchanger use. Prices show savings between 10 and

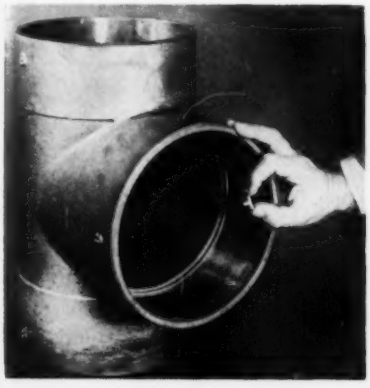


32 pct. Refinements in production and quality control methods have produced a tubing that can be knotted without damage. (Babcock & Wilcox Co.)

For more data circle No. 48 on postcard, p. 121

Fittings and Valves

Approximately 200 new items are being added to a line of copper and brass pipe and tube valves and fittings, including additional types and



sizes of wrought and cast solder joint fittings, drainage fittings, valves, and tube staples. (Chase Brass & Copper Co.)

For more data circle No. 49 on postcard, p. 121

Coolant Filter

A centrifugal coolant clarifier can be used on oil or aqueous coolant to remove ferrous, nonferrous, and nonmetallic solids. Extracted solids

Faster Load Lifting With New Coffing Quik-Lift Air Hoist

12 MODELS
lift full load 10 feet
500-pound hoist— 7 seconds
1000-pound hoist— 9 seconds
2000-pound hoist—24 seconds

Speed, accurate control, safety and long life are combined in the new Coffing Quik-Lift Air Hoist to give you efficient hoisting power.

Smooth power flow and absolute control at all speeds and loads is provided by the heavy-duty, 8-blade rotary air motor, the air-cooled disc brake and sensitive controls.

This hoist will not drop its load if air pressure fails for the brake is always engaged except when the motor is activated. If air supply fails, load can be safely lowered manually by the brake adjustment screw. The air-cooled, disc-type brake provides four times as much braking area as conventional brakes.

Free movement so that the push-button pendent control is always correctly positioned for easy use is provided by the swiveling features of the air supply hose and pendent hoses. Safety hooks, which are standard equipment on all models, swivel on roller thrust bearings.

The Coffing Quik-Lift Air Hoist is available in 500, 1000 and 2000-pound capacities —with either link or roller chain and with interchangeable manual pull-cord or push-button pendent controls. Ask your distributor or write for Bulletin ADH-79.

COFFING HOIST
DIVISION OF
DUFF-NORTON COMPANY
814 Walter Street • Danville, Illinois

CORFING HOISTS
Ratchet Lever • Air
Hand Chain • Electric

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DUFF-NORTON JACKS
Ratchet • Screw
Hydraulic • Worm Gear

save machining . . . save material . . . by using

Edgewater rolled steel rings

Simple or complex cross-sections are formed so accurately by the Edgewater process, that machining is greatly minimized. These rings are rolled from solid blocks of steel. Hot working develops greatest strength and toughness in the metal. Diameters from 5 to 145 inches. Materials include carbon and alloy steels, stainless, tool steel, titanium.

Write for descriptive bulletin.

Edgewater Steel Company

Dept. IA • P.O. Box 478 • Pittsburgh 30, Pa.

are discharged once or twice a day by means of a reversing current switch. Sludge can be removed without stopping the machine, and sealed bearings further reduce downtime. Inlet and outlet connections on both sides permit easy coupling to a multiple installation. Capacity is 33 gpm. (De Laval Separator Co.)

For more data circle No. 50 on postcard, p. 121

Forgeable Tungsten

Forgeable sintered tungsten and tungsten alloy billets and preformed shapes are available. Tungsten metal 99.9 pct pure, with densities exceeding 90 pct of theoretical, is suitable for forging at 3400° to

3500°F, and has remarkable machinability after forging. Arrangements are being made to produce 10 x 20-in. pure tungsten ingots. (Firth Sterling Inc.)

For more data circle No. 51 on postcard, p. 121

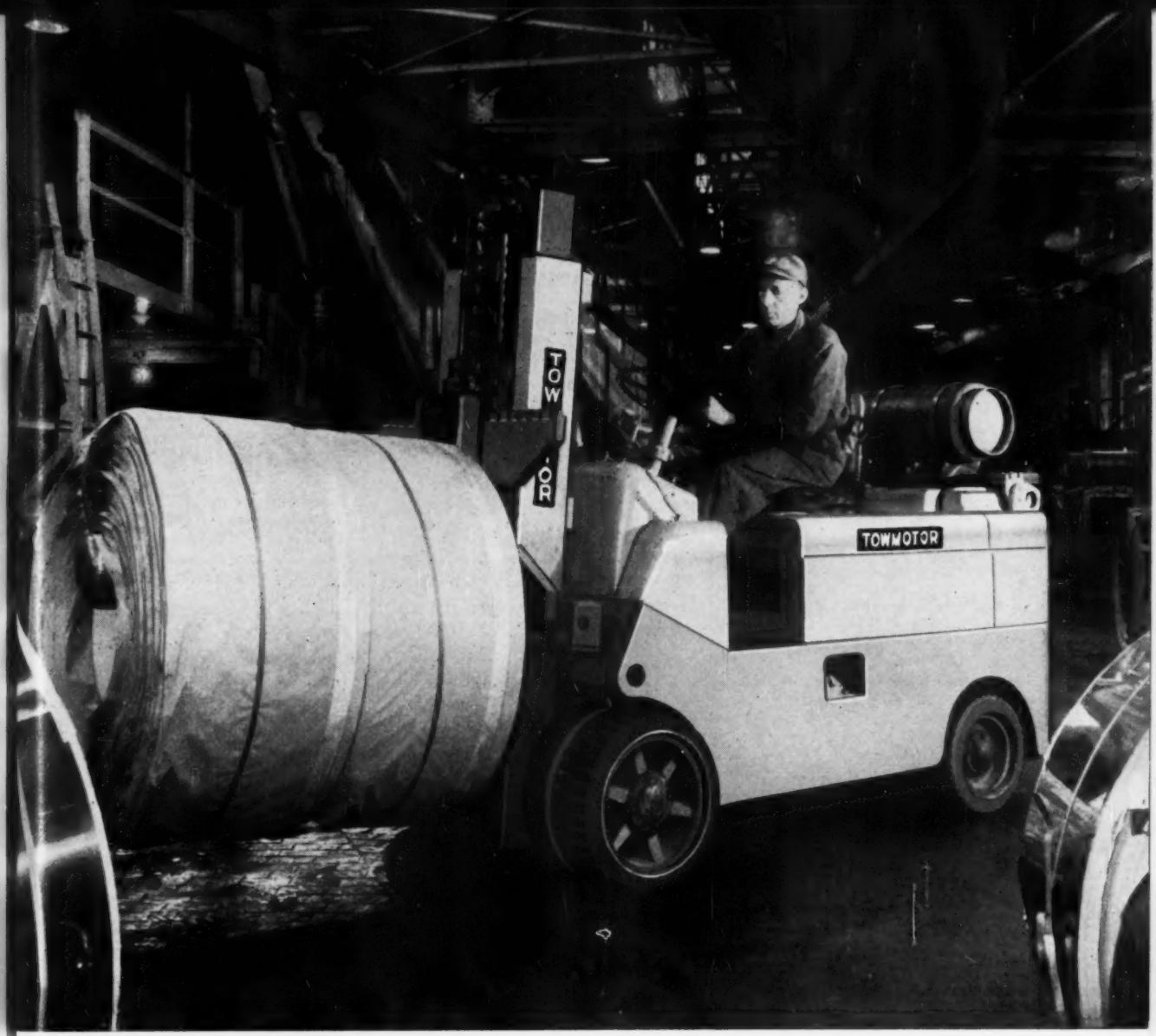
Improving Castings

Some companies seeking to improve the appearance of castings find that an appropriate filling material can do the job well, eliminating welding and brazing operations. An iron cement has been found good for this purpose, providing a finish almost indistinguishable from that of the casting itself. (Smooth-On Mfg. Co.)

For more data circle No. 52 on postcard, p. 121

Locking Fasteners

Flanged high tension locking screws and nuts provide superior



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Of all fork lift trucks, *this Towmotor Pace-Maker has it!* Mass-handling miracles seem to happen every minute it's on the job. Its hydraulic muscles hustle heavy loads through storage, production and shipping with a real promise of extra profits *around the calendar.*

Let us send you latest on-the-job facts applying to your specific type of factory, mill or warehouse operation. Ask for Certified Job Studies relating to your own business—and the new *Pace-Maker* Booklet SP-23. Write *Towmotor Corporation, Cleveland 10, Ohio.*

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SONIC ENERGY CLEANING SYSTEM

Pays for itself in 6 months!

If you've heard people say that the results of Sonic Energy Cleaning can be spectacular, here's an example of what they mean:

A nationally known aircraft parts manufacturer had to remove dirt, grease, sludge, metal chips and abrasives from assembly components of a 4-stage aircraft compressor. Optimum cleanliness was vital. Previous methods were costly and unreliable.

Using the Bendix Sonic Energy Cleaning System with an inexpensive, nonflammable, nontoxic detergent solution, in a one-minute cleaning cycle—all traces of contamination—including both soluble and insoluble soils—were removed, even from blind holes, interstices, crevices, screw-threads, porous surfaces.

And the best part—direct labor costs were reduced 50%; expensive solvents were eliminated; rejects due to contamination were eliminated; and the complete Bendix Sonic Energy Cleaning System was fully amortized in six months.

To help you determine if results like these are possible in your cleaning operation (and sometimes they're not), Bendix® maintains a complete Applications Laboratory to go with the industry's most complete line of Sonic Energy Cleaning equipment.

FREE! GET YOUR COPY OF THIS TIMELY, AUTHORITATIVE REPORT ON SONIC ENERGY CLEANING

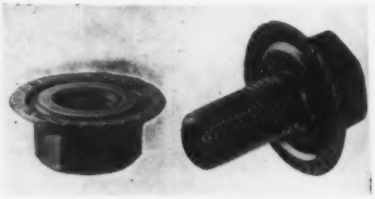
All the facts at your fingertips. Processes detailed . . . test results analyzed . . . and a Five-step Plan to help you determine if Sonic Energy Cleaning will be economically advantageous for you. Send for your free copy today. PIONEER-CENTRAL DIVISION, BENDIX AVIATION CORPORATION, 2729 HICKORY GROVE ROAD, DAVENPORT, IOWA.

Bendix AVIATION CORPORATION

SONIC ENERGY CLEANING

DESIGN DIGEST

locking performance and eliminate the need for washers in assembly of metal products. They lock with both ratchet-like teeth and high thread tension. Carburized teeth on



the flanges allow low-friction tightening but are vertical on the back side to prevent loosening. Tensile strength is 125,000 psi. These fasteners are available in sizes from #6 to ⅜ in., and can be produced in any length from twice diameter up in a wide range of sizes and styles, except flat head. (Russell, Burdsall & Ward Bolt and Nut Co.)

For more data circle No. 53 on postcard, p. 121

One-Coat Porcelain

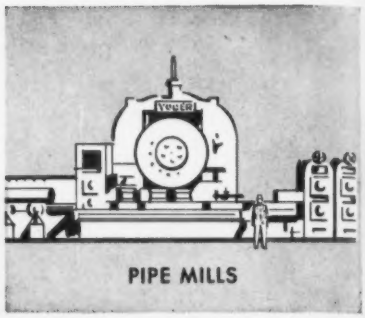
One-coat white porcelain enamels for non-premium steels are now available. Elimination of the "ground coat" used heretofore brings economy and might permit the use of porcelain enamels on products that for economic reasons have been finished in other materials. Careful base metal preparation is required with this process. (Ferro Corp.)

For more data circle No. 54 on postcard, p. 121

Centrifugal Pump

Simple in design and conserving weight and space to reduce costs, a centrifugal pump is highly efficient and flexible in application. Two metal stampings form a housing enclosing a welded propeller assembly. The unusually smooth interior surfaces give good flow characteristics. Perfect impeller balance is built in. All parts are fabricated from noncorrosive alloys. The pump is available coupled directly to motor, extended from motor for special heat and chemical applications, or alone for use with any power supply. (R. S. Corcoran Co.)

For more data circle No. 55 on postcard, p. 121



PIPE MILLS

YODER PIPE AND TUBE MILLS

Today's expanding markets and tightening economy demand closer production cost control. YODER'S complete line of ferrous or non-ferrous Pipe and Tube mills can help you meet production schedules economically . . . help you realize significant savings in the manufacture of tube and pipe.

YODER Pipe and Tube mills offer flexible production to meet fluctuating demand. They adapt easily to the most rigorous schedules. Everyday manufacture of constant high quality pipe and tube in diameter of 5/16" to 24". Speeds up to 350 fpm plus can be obtained with YODER mills.

YODER also makes a complete line of Slitting equipment and Cold Roll-Forming machinery. Send for your copy of the fully-descriptive book covering Tube Mill operation.

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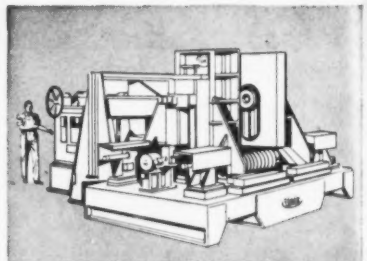
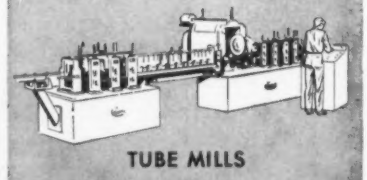


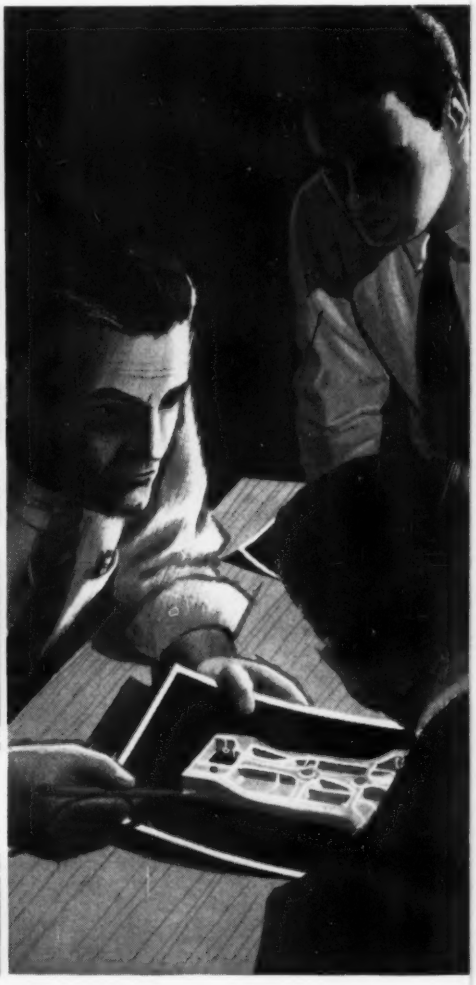
HEAVY DUTY UNCOILERS



TUBE MILLS

ENGINEERING YODER MANUFACTURING PIPE AND TUBE MILLS (ferrous or non-ferrous)

...where industrial progress is cast in steel



DESIGN ENGINEERING...SERVICE IN DEPTH

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How General Steel Castings Can Improve Product Design and Performance.
General Steel Castings, Station 201
Granite City, Illinois

The broad scope of General Steel's design engineering department is unique in the industry. The department is well-staffed with experienced personnel skilled in design, stress analysis, testing and development work. This unified group complements the complete service offered by General Steel.

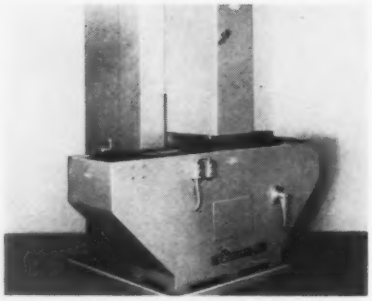
The design section alone contains many groups of specialists. In addition, you can draw upon the technical knowledge of the stress analysis group; the experimental group, with all necessary equipment and facilities to conduct static and dynamic testing; and the development group, which provides engineering services on special projects. These facilities can be of substantial benefit to you in developing cast steel structures and steel castings used in cast-weld and composite structures for your products.

Our complete services range from creative analysis of your product components in the "raw idea" stage . . . to follow-through on performance in the field. We prefer to team up with you from the start . . . for in this way you can take full advantage of our many specialized talents.

GENERAL STEEL CASTINGS

GRANITE CITY, ILL. · EDDYSTONE, PA. · AVONMORE, PA.

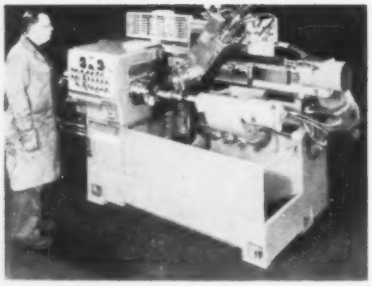
New Equipment and Machinery



Grinds, Polishes Stock up to 15 in. Wide

A new machine abrasive-belt grinds, polishes, and deburrs flat surfaces of forms up to 15 in. wide and 8 in. thick. There are two models. A conveyor-belt type works miscellaneous - shaped parts. A pinch-roll type is for high production of sheet, coil, or bar stock. Both feature pneumatic belt tension, positive manual or automatic belt tracking, micrometer grind-pressure adjustment, infinite speed control, and easy maintenance. Tandem machine arrangements can work with successively finer grits to obtain required finishes. (Acme Mfg. Co.)

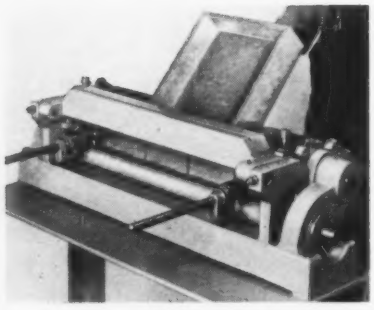
For more data circle No. 70 on postcard, p. 121



Same Template—Three Rough, One Finish Cut

With a 25-hp automatic hydraulic tracer lathe, graduated scales for all phases of setup insure maximum accuracy, and removing stock in up to four cuts reduces grinding or finishing requirements. After roughing, the turret indexes for a 0.020-in. finish cut, possible at speed with ceramics. A two- or four-speed head affords speeds to 3100 rpm. Feed is infinitely variable. Facing slide is optional. Center-to-center is 24, 32, or 40 in.; maximum diameter is 4½ in. (Sunstrand Corp.)

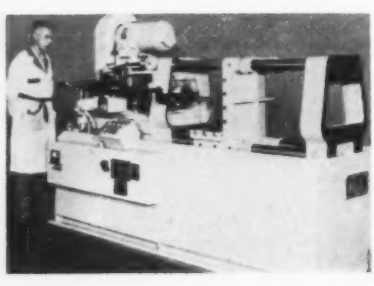
For more data circle No. 71 on postcard, p. 121



Box Finger Brake Is Rugged and Versatile

A box finger brake with 24-in. forming width is especially useful for forming boxes, cabinets, chassis, and panels with up to 1-in. lip or flange on top or bottom, and performs a variety of other work by arranging the fingers in different ways. Material as heavy as 16-gage mild steel can be formed as deep as 3 in. with up to a ½-in. lip. Maximum bending angle is 135°. The folding blade can make bends ¼ in. apart, and is reinforced to prevent bowing of heavy material. A micrometer-operated back gage enables fast gaging. (O'Neil-Irwin Mfg. Co.)

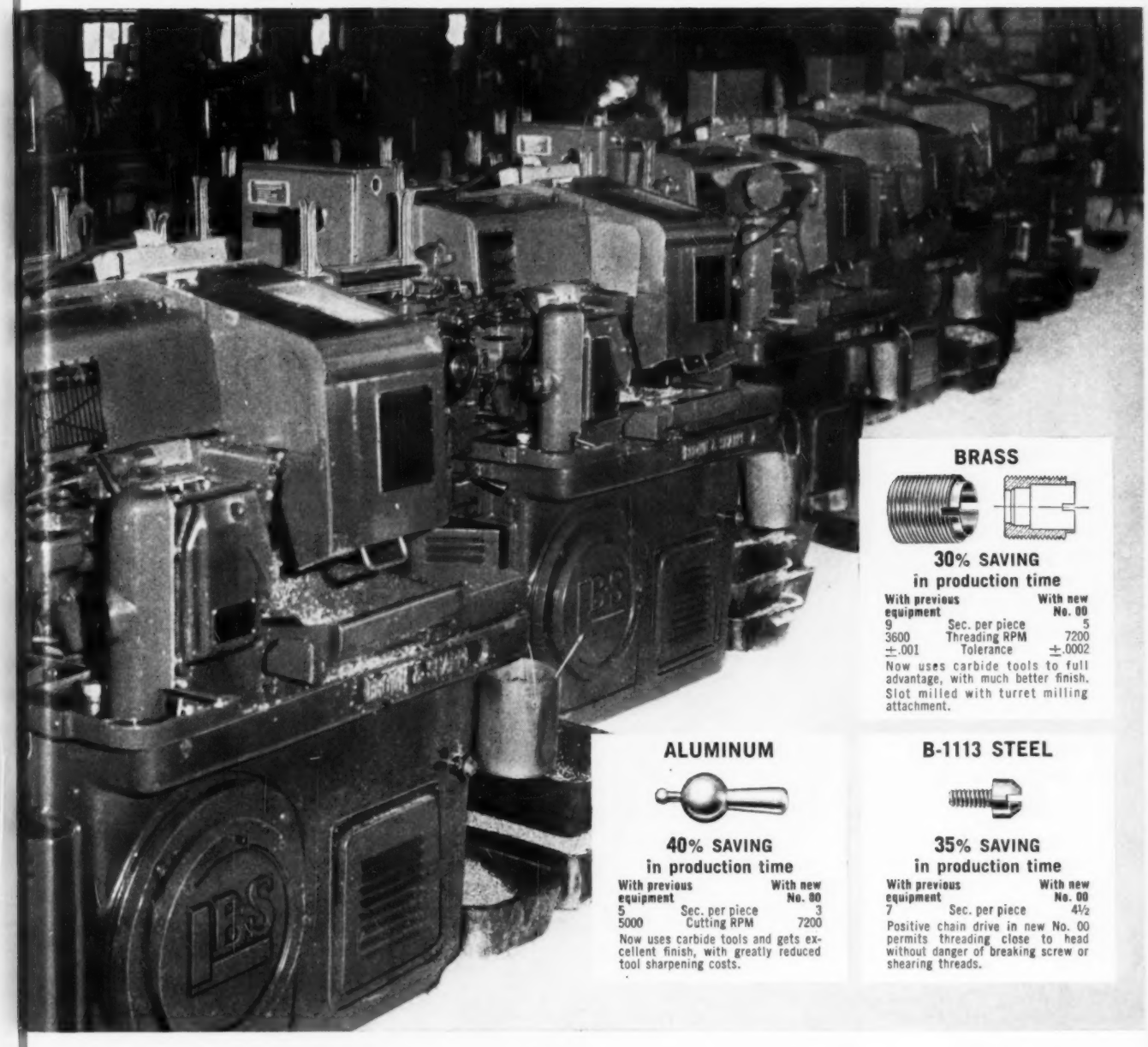
For more data circle No. 72 on postcard, p. 121



Drills, Gun-Drills, Bores at High Speed

A precision motorized spindle with high thrust enables a machine to deep-hole drill, gun-drill, gun-ream, and precision-bore at high speed. Twist drills cut ½-in. steel 40 to 80 ipm. The head moves on 3-in. guide bars, and work is held on a table with ample horizontal and vertical surfaces. The table can be numerically positioned to eliminate fixtures. A second drill can be opposed for secondary operations. A torque sensor prevents drill breakage by retracting drill upon overload. Feed is variable from 0 to 150 ipm; rpm run from

At ARROW (AH) HART



BRASS

30% SAVING
in production time

With previous equipment		With new No. 00
9	Sec. per piece	5
3600	Threading RPM	7200
±.001	Tolerance	±.0002

Now uses carbide tools to full advantage, with much better finish. Slot milled with turret milling attachment.

ALUMINUM

40% SAVING
in production time

With previous equipment		With new No. 00
5	Sec. per piece	3
5000	Cutting RPM	7200

Now uses carbide tools and gets excellent finish, with greatly reduced tool sharpening costs.

B-1113 STEEL

35% SAVING
in production time

With previous equipment		With new No. 00
7	Sec. per piece	4½

Positive chain drive in new No. 00 permits threading close to head without danger of breaking screw or shearing threads.

Production gains average 35%
with new Brown & Sharpe Automatics

Arrow-Hart and Hegeman Co. depends on screw machines for an exceptional volume and variety of parts used in their big line of electrical products. Production efficiency of this department is a vital factor in cost control. That is why nineteen new Brown & Sharpe No. 00 and No. 2 automatics are now in operation, and more are being installed as old model machines are replaced.

The parts described are typical of hundreds of jobs now running on the new No. 00 automatics. Production gains on brass, steel, and aluminum average 35%, and on some jobs where second operations were eliminated, net production was increased as much as 100%.

Figure the comparable savings you can make with the extra speed and precision — the adaptability for combined operations — the faster set-ups and extended tool life. You'll see why so many buyers say, *"They pay for themselves, in record time."* For complete details, write: Machine Tool Division, Brown & Sharpe Mfg. Co., Providence 1, R. I.

Brown & Sharpe PRECISION CENTER

beautiful products

from

CONTINENTAL® WIRE

EXAMPLE
FIREPLACE CURTAIN SCREEN WIRE

The beauty and smooth operation of fireplace curtain screens depend on accurate forming, even spacing, and neat appearance of the mesh. The wire used must be of correct temper, diameter and finish. Uniformity of these properties is of prime importance. Leading fireplace equipment makers choose Continental Wire because it possesses these features dependably, in coil after coil. The ability to take intricate forming is an important reason why Continental Wire is specified for scores and scores of other products made with wire. Continental Curtain Screen wire, 19 gauge through 20 gauge inclusive in size, is available in 500 pound to 650 pound catchweight single length coils packed in Leverpac Drums for faster weaving with less down time, cleaner handling and better storage. For wire in practically any size, finish, temper or analysis, in low or medium low carbon steels, see Continental first!

Fine Finishes in Manufacturers' Wire

CONTINENTAL STEEL
CORPORATION

KOKOMO • INDIANA

PRODUCERS OF: Manufacturers' Wire in many sizes, tempers and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright and special shaped wire. Also Welded Wire Reinforcing Fabric Nails, Continental Chain Link Fence, and other products.

NEW EQUIPMENT

600 to 4000. Coolant can be fired through gun drills. (Walter P. Hill, Inc.)

For more data circle No. 73 on postcard, p. 121

Small TIG Holder

A 350-amp water-cooled holder for tungsten-inert-gas welding can weld all metals up to ⅛ in. or

heavier. With minimum interference dimension, the holder is easy to use in confined spaces. (Air Reduction Co., Inc.)

For more data circle No. 74 on postcard, p. 121

Gas Scrubber

A new type of high-efficiency scrubber uses impingement of the gas stream into the scrubbing fluid at high velocity, resulting in high dust-collection efficiency with low power requirements. It can be made of almost any type of material. (Western Precipitation Corp.)

For more data circle No. 75 on postcard, p. 121

New Abrasive Wheel

A patented new type abrasive wheel increases grinding production on carbides, cast iron, and hard-to-

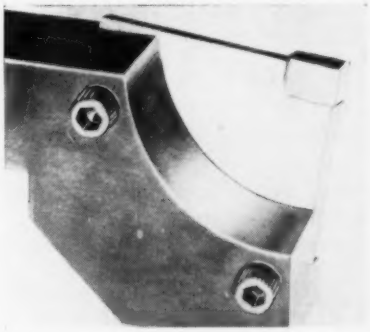
grind steels. Fine abrasive pellets loosely dispersed throughout the matrix function as a cooling element

and release loose abrasive between wheel and work, increasing rate of stock removal and improving surface finish. Use of a harder, longer-lasting wheel matrix is also possible. Tests on the process have been especially gratifying on segmental applications on large surface grinders. (Macklin Co.)

For more data circle No. 76 on postcard, p. 121

Rigid Cutoff Tool

A new type cutoff tool for turret lathes and automatic screw machines features a heavy hardened steel support directly below the cutting tip. It provides rigidity to permit higher speeds and feeds, as well as the use of any grade of carbide or Tantung. In tests, 2-in.-diam CRS bars have been cut in 5 seconds. Holders and blades are ground accurate to 0.001 in. in all dimensions. Four sizes are available. (General Machine Co., Inc.)



For more data circle No. 77 on postcard, p. 121

Dished Grinding Wheel

A dished-depressed center grinding wheel has unusual strength and resistance to breakage. It is reinforced with three full layers of fiberglass permanently resin-bonded and molded to shape. The narrow contact area resulting from the convex outside results in faster cutting and greater economy. (American Emery Wheel Works)

For more data circle No. 78 on postcard, p. 121

View Tool Shaping

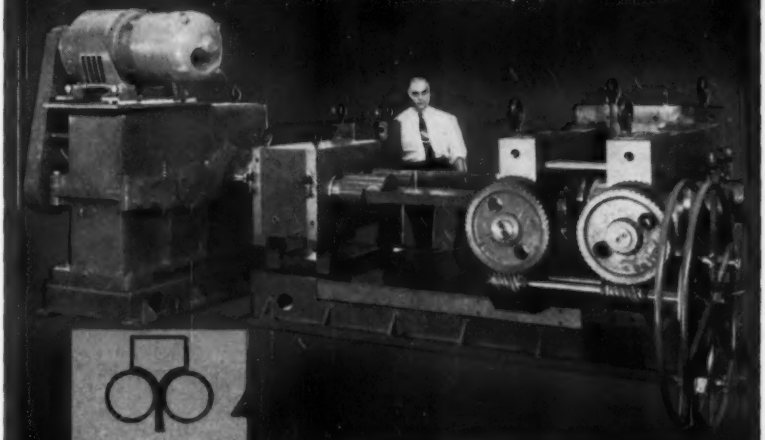
A 20-to-1 magnification projector permits viewing of the machining of punches or forms. Tapers and contours can be cut to plus-minus-3-degree tolerance, with an overall

For Rolling Powdered Metals

GET THE FLEXIBILITY AND ECONOMY OF A

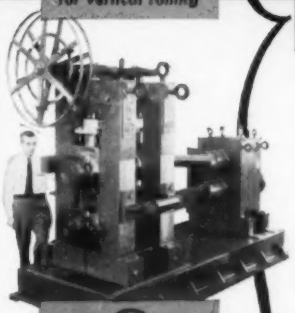
FENN

*Convertible Rolling Mill**



Pinion stand and housing arranged for vertical rolling

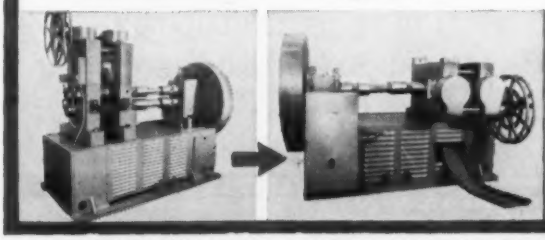
As a vertical mill ideal for rolling Powdered Metals—yet converts to a standard horizontal mill for rolling strip.



Pinion stand and housing quickly converted for conventional, horizontal rolling.

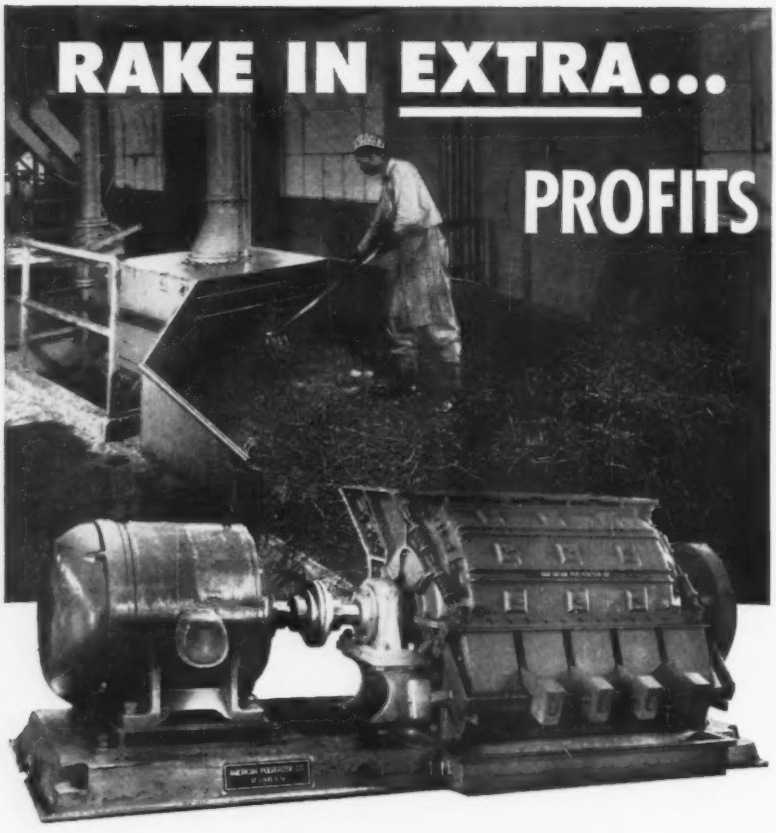
Here is outstanding flexibility for the metallurgical laboratory or production. This Fenn Dual-Purpose Rolling Mill can be used for both powder metallurgy and strip rolling. Combines all the precision features of other Fenn mills, yet, this Fenn Convertible Rolling Mill is literally two mills in one... ideal for application wherever space and capital are limited. By simple movement of pinion stand and roll housing, it quickly converts for either vertical or horizontal rolling. Mill featured is a Model V4-126 Two-High/Four-High Combination Mill with 12" rolls, 40 HP variable speed AC drive. Write for complete information and Fenn catalog FRM-58.

* patent applied for



The inherent design of Fenn Rolling Mills permits all sizes to be supplied with the Convertible feature. Illustrated is a Series 6 Convertible Mill.

THE FENN MANUFACTURING COMPANY • 304 FENN ROAD, NEWINGTON, CONN.



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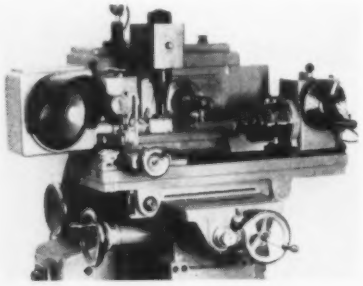
NEW EQUIPMENT

linear tolerance of plus - minus 0.00025 in. guaranteed. Featured are speeds of 50, 75, and 110 strokes per minute, a working area 6 x 6¼ in., choice of 220- or 440-v motor, and a wide supply of tool

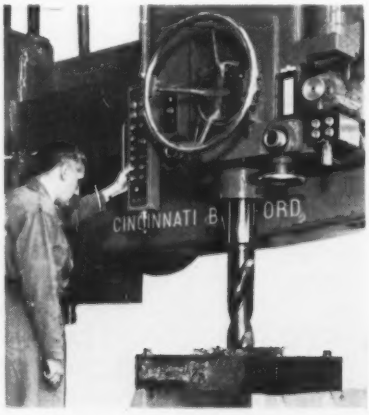


bits for all types of materials. A large dividing head with automatic circular feed is employed, and a co-ordinate chuck permits machining radii, angles, and tapers automatically. (Jersey Mfg. Co.)

For more data circle No. 79 on postcard, p. 121

"Elephant" Radials

Radial drills join the ranks of elephant tools with the introduction of 34-in.-column machines with 10-, 12-, or 14-ft arms, full pendant control, rapid traverse to spindle, power assist for swinging the arm, and complete preselection of 32



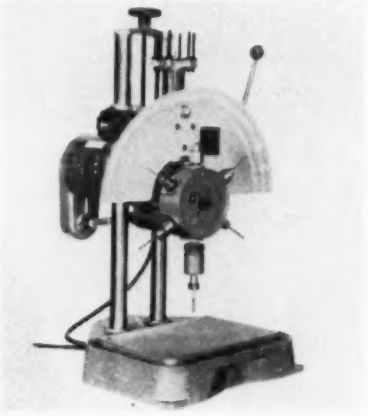
speeds and 18 feeds. Tremendous thrust and torque in drilling and backfacing are possible with 50-hp motors. The heavy loads generated are absorbed by four heavy-duty angular-contact bearings for vertical thrust and three for backfacing loads. (Cincinnati Bickford Div.,

Giddings & Lewis Machine Tool Co.)

For more data circle No. 80 on postcard, p. 121

Bench Turret Drill

A bench model in a line of power-indexing turret drills combines compactness with speed of operation. It occupies only one-

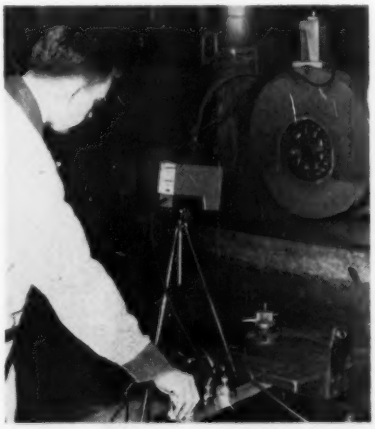


third the space of a six-machine line, and often doubles production by keeping the operator in one position. Expensive drill jigs can be replaced with a standard index fixture. Speeds are preselected. (Burg Tool Mfg. Co., Inc.)

For more data circle No. 81 on postcard, p. 121

Precision Balancer

A portable precision balancer is designed for easy operation, high sensitivity, and vibration analysis of all types of machinery to cut main-



tenance and increase quality of production. It adjusts to handle vibration amplitudes from 10-millionths to ⅛ in. Vibrations are detected and amplified to trigger a strobe light and "freeze" the image of the rotating part, pinpointing the trouble source. Operating on standard current, it is ideal for removing vibration from grinding wheels and cutter heads, and for detecting vibration caused by worn bearings, belts, and misalignment. (Stewart-Warner Corp.)

For more data circle No. 82 on pstcard, p. 121

MoS_2 for Wiremaking

A brand of molybdenum disulphide has been found by one company to be a most effective wire-drawing lubricant, having high temperature resistance, strong metal affinity, extreme die-pressure resistance, and very low friction properties. It eliminates many of the disadvantages found in metallic lead, and is easily removed from the finished wire electrolytically. One manufacturer increased drawing speed of copper alloy wire up to 2000 fpm. (Climax Molybdenum Co.)

For more data circle No. 83 on postcard, p. 121

Steel Service Centers throughout the country have built up their inventories in anticipation of a suspension in steel production. These stockpiles totaling almost 3,600,000 tons are valued at ¾ billion dollars. If you have been using a steel service center as your source of supply—you can thank your lucky stars—because chances are they will still be able to fill your requirements.

Each distributor's representative is a metal specialist and is qualified to assist you with application and supply problems.

MICROROLD STAINLESS STEEL is regularly carried in stock in 252 of these independent steel warehouses. Washington Steel is a producer of sheet and strip exclusively, all of which is precision rolled on Sendzimir mills.

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By merely picking up your phone and calling your Steel Service Center, you can order for immediate delivery exactly the steel you need.

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The Iron Age Summary

Mills Uncertain on Market Trend

BULLETIN

As the steel industry and the union went down to the wire in their negotiations late Tuesday, thousands of tons of steel were lost due to precautionary shutdowns of steelmaking units.

Even if there were an eleventh-hour settlement, it would take several days for the mills to get back to normal production.

▪ Steel mills this week are still uncertain how strong their market will be when their operations are back to normal. The answer to this question depends on just how well steel users have been able to build their inventories. And if inventories are heavy, as the mills suspect, are they in balance?

Mills producing the large-tonnage carbon steel products are optimistic. They know there was a massive inventory buildup in the first half. But they are encouraged by these facts:

1. There have been no significant cancellations or deferments since the start of July.

2. Talks with customers indicate most want all the steel they have ordered.

3. The rate of incoming orders at one large mill last week was about in line with its operating rate.

4. Plate and structural schedules are already 50 pct filled for September.

Letdown Inevitable — With the usual summer letdown due to metalworking plant vacations hitting tubular products and specialties, a drop in steel operations is considered inevitable; even if plates, sheets, and structurals remain as strong as they now seem.

Some steel men now believe the "adjustment" in orders for heavy steel and flat-rolled will not come before September or the fourth quarter. The feeling is customers will take steel now ordered but will hold back on new orders.

Heavy Shipments—Reports from steel producing centers indicate the mills made good use of the two-week steel labor contract extension to take care of their customers. In most areas, shipments were so heavy they ran ahead of the necessary paper work.

Apparently the long-predicted bottleneck in transportation facilities failed to materialize. Few mills reported serious problems.

Down, but Not Out—Assuming no strike, there will be plenty of steel available for the balance of the year. The mills' capacity is considered large enough to handle steel requirements even though the tempo of industrial activity should continue its upward trend. Further, the element of strike hedging would no longer be a factor.

Still, the strength of the economy has been a pleasant surprise for steelmakers. They have revised upward several times their estimates of steel production during the last half.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,264	2,264	2,620	1,481
Ingot Index				
(1947-1949=100)	141.0	141.0	163.1	92.2
Operating Rates				
Chicago	90.0	89.5*	94.0	63.0
Pittsburgh	76.0	80.0*	97.0	46.0
Philadelphia	83.0	81.0*	99.0	60.0
Valley	72.0	73.0*	84.0	46.0
West	77.0	70.0*	92.5	62.0
Cleveland	82.0	73.0*	94.0	46.0
Detroit	83.0	82.0*	96.0	39.0
Buffalo	105.0	105.0	105.0	57.0
South Ohio River	95.5	89.0*	92.0	53.5
South	81.5	85.0	92.0	38.0
Upper Ohio River	91.0	85.0	90.0	77.0
St. Louis	87.5	83.0*	72.0	87.0
Aggregate	80.0	80.0	92.5	54.9

*Revised

Prices At a Glance

(Cents per lb unless otherwise noted)	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel base	6.196	6.196	6.196	5.967
Pig Iron (gross ton)	$66.41	$66.41	$66.41	$66.49
Scrap No. 1 hvy (Gross ton)	$39.17	$39.17	$38.17	$37.50
No. 2 bundles	$27.00	$26.67	$25.33	$26.83
Nonferrous				
Aluminum ingot	26.80	26.80	26.80	26.10
Copper, electrolytic	31.50	31.50	31.50	25-26.50
Lead, St. Louis	11.80	11.80	11.80	10.80
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	102.50	103.00	104.00	94.00
Zinc, E. St. Louis	11.00	11.00	11.00	10.00

Third Fastener Pricing System

Russell, Burdsall & Ward now uses fastener pricing featuring product lists, simplified discounts.

With the new method there are now three systems of pricing in the fastener industry.

▪ Russell, Burdsall & Ward Bolt & Nut Co. has moved to simplify fastener pricing.

The Port Chester, N. Y. company has introduced a new pricing system. It uses product lists with simple discounts, while previous systems required figuring prices from one major list through a complicated system of additions and deductions.

With the introduction of the RB&W system three different methods of pricing are now used in the fastener industry. They include: (1) Previous methods of list prices and discounts; (2) the new RB&W system; and (3) a net pricing system set up by Pittsburgh Screw & Bolt this spring. (See The IRON AGE, April 2, 1959, P. 25.)

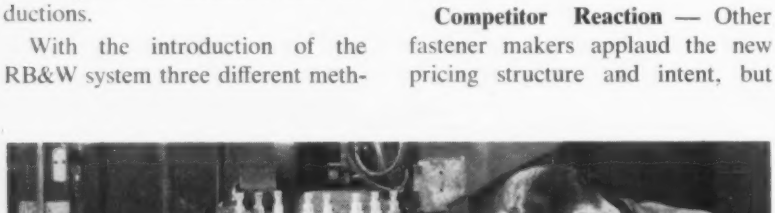
User Reaction—Initial reports on the new RB&W system indicate customers welcome the removal of confusion and multiple pricing, plus savings in ordering, checking invoices, and pricing of finished products using mechanical fasteners. The company says the response to date shows the new system will be "overwhelmingly successful."

Competitor Reaction — Other fastener makers applaud the new pricing structure and intent, but charge the overall result is at least a 5 pct cut in fastener prices in an already depressed and overstocked market. Midwestern producers say they will not meet the new prices, particularly at a time when there is a strong probability of raw materials cost increases.

RB&W replies that it has not actually dropped prices, but rather now shows actual current market prices in its new lists. "While the new price lists and simplified discount pattern reflect definite changes from the previous, they recognize competitive conditions in certain areas and are designed to take the work out of pricing and billing and solve some of the fastener users' buying problems," comments John S. Davey, RB&W vice president, sales.

The new lists cover popular products and feature simple discounts. Product classifications have been simplified by use of more descriptive nomenclature and by dropping low-volume products.

Other Views — Although some sections of the fastener industry believe the shift should be to net pricing, RB&W still believes that "published prices should be on a list and discount basis," according to Mr. Davey. But the company will continue to supply net price schedules to customers who want them.



FASTENER PRICING: Manufacturers keep making efforts to simplify fastener pricing practices. Latest approach has come from Russell, Burdsall, & Ward Bolt & Nut Co. (See story.)

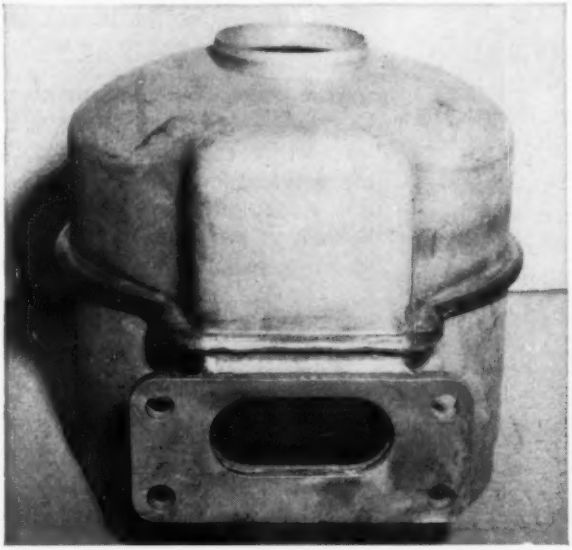
Rectifier Price Cut

General Electric Co., has again reduced priced on its lines of silicon controlled rectifiers. Price reductions range from 25 pct on the 16-ampere, 200-volt model, to 14 pct on the 10-ampere, 300-volt model.

Lincoln

WELDYNAMICS

NEWS ABOUT ARC WELDING AT WORK CUTTING COSTS



Arc-welded pressed-steel assembly, left, weighs only 11½ lbs.; iron casting formerly used, right, weighed 26¼ lbs.

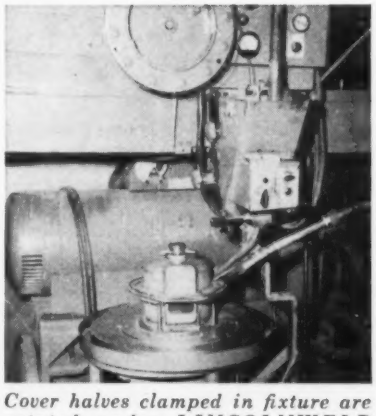
White spots on the casting are blow holes that were repaired by cold-soldering.

REDESIGNED FOR WELDING, AIR CLEANER COSTS 36% LESS

Reduction in weight of 56 pct, unit cost saving of 35.8 pct and a cut in manufacturing rework from 25 pct to 3½ pct; all three were realized by a change from cast iron to arc-welded pressed steel air cleaners for Caterpillar construction and mining equipment.

The cleaners are basically a 9-in. diam. cylindrical body attached to a central cover shell carrying a mounting flange and a top dome or cover with a 2½ in. neck for the intake tube. Originally the two elements of the dome were made as a casting weighing 26¼ lbs. Connections to the center tube and lower body were soldered, which required first dip-tinning the casting.

Leaks in the soldered joints, along with pinholes and porosity in the casting after machining, ran as high as 25 pct during 10-lb. air pressure testing; subsequent cold-soldering repairs had to be made. Beyond this, breakage of castings in handling and transporting often ran up to 5 pct.



Cover halves clamped in fixture are rotated under LINCOLNWELD submerged-arc welding head. The 34-in. weld takes 30 seconds.

In the redesign, the dome shells are formed from 2 flat blanks of 12 gauge steel. After trimming and punching, they're welded automatically on a Lincolnweld submerged-arc automatic welder.

DESIGN AIDS AVAILABLE

The new 11th edition of "Procedure Handbook of Arc Welding Design and Practice" has 240 pages on Machine Design. An authoritative work, the "Procedure Handbook" is written to help the machine designer achieve the most efficient use of welded steel. The price is $3.00, $3.50 outside the U.S.A. The book may be ordered from The Lincoln Electric Co.

Machine Design Seminars are conducted regularly at the Lincoln plant. Write for dates and information.

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Steel Users "Refine" July Orders

Buyers are making few moves to cancel or defer tonnage until the steel labor situation clarifies.

Instead they concentrate on making last-minute changes in current orders.

▪ Steel mill customers are worrying about the present as well as the future.

While steel wage talks continued they were making few moves to cancel or defer orders. Instead they were concentrating on "refining" orders due for delivery soon.

"There's an unusually heavy amount of shifting around on orders," says one mill man. "Buyers want changes in sizes, finishes, and other items right up to the last minute. In some cases it's practically impossible to fit these changes into mill schedules."

The customers are playing the situation by ear—buying or not buying strictly as needs indicate. An Eastern sheet mill had a request to drastically cut back the August tonnage of one large customer. Then another change came through restoring the original order.

However, structural users in the same area were not even concerned when it appeared they would not get all June tonnage before a possible strike on June 30. And at the moment they "just aren't interested in new orders," according to one mill spokesman.

On the other hand, Chicago mills were surprised by the action of some sheet customers there. The producers had expected order deferments when a strike didn't come June 30. Instead some buyers are asking for additional tonnage on September bookings.

Sheet and Strip — Third quarter bookings are coming in to mills at a good rate. But a lot depends on the area involved. Most **Chicago** mills are sold out on hot-rolled sheet for the third quarter. Some customers are trying to boost their September cold-rolled sheet bookings above their quotas. **Pittsburgh** producers have sheet bookings filled in through August. But some are wondering if all this tonnage is solid and immune to cancellation. **East Coast** mills are generally booked through August. There have been few concellations. September and October orders are now being booked.

Plates and Shapes — Plate mills say there have been virtually no cancellations of third quarter tonnage. Most **Pittsburgh** mills are booked through August and receiving September orders. **East Coast** mills are in the same position. **Chicago** producers are sold out through the third quarter.

Structural bookings are a little less robust. Demand is good in the **Midwest** where building contracts are plentiful. In contrast **Eastern** mills say customers are well stocked and doing little ordering. One mill says July will be busy thanks to backlogs carried over from June. Beyond that point the outlook is not too encouraging.

Wire Products—So far there have been only isolated cancellations and setbacks of third quarter orders, the mills say. Producers expect July and August shipments to decline because of vacations in customer plants. Roadbuilding fabric is one wire product doing exceptionally well.

Tinplate—Although the big rush for shipments has died down producers don't expect a drastic cut in order activity. One **Pittsburgh** mill believes third quarter shipments will be 70 to 80 pct of those in the booming second quarter.

Some canmakers are reported worried over their inventory of tinplate. They are urging the mills to set aside steel now for third quarter tinning operations. Most canmakers started building stocks as early as last November. But even so they are still concerned about supplies.

Pipe and Tubing—Incoming orders for oil country seamless are in good volume, mills report. In addition, the tonnage apparently reflects definite orders earmarked for definite jobs.

With the help of the two-week labor contract extension mills shipped all June orders for butt-weld pipe. Some of these would not have gone out if the mills had been struck June 30.

New Coil Line—U. S. Steel has placed contracts for construction of a new coil welding line for the No. 18 Hot Strip Mill at its McDonald, O., plant. The mill presently produces coils weighing up to 8500 lb. With the new line, coils weighing 30,000 lb will be produced.

PURCHASING AGENT'S CHECKLIST

How "marketing in depth" works for basic metals. P. 63

Welding equipment sales improve as manufacturers discover new markets, enlarge existing ones. P. 66

How a warehouseman looks at steel imports—An Iron Age interview with Robert G. Welch, of the American Steel Warehouse Association. P. 68

COMPARISON OF PRICES

(Effective July 14, 1959)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in **Heavy Type**; declines appear in *Italics*.

	July 14 1959	July 7 1959	June 16 1959	July 15 1958
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	4.925¢
Cold-rolled sheets	6.275	6.275	6.275	6.05
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.60
Hot-rolled strip	5.10	5.10	5.10	4.925
Cold-rolled strip	7.425	7.425	7.425	7.17
Plate	5.30	5.30	5.30	5.12
Plates, wrought iron	13.55	13.55	13.55	13.15
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.30
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.00
Special coated mfg. ternes	9.90	9.90	9.90	9.55
Bars and Shapes: (per pound)				
Merchant bar	5.675¢	5.675¢	5.675¢	5.425¢
Cold finished bar	7.65	7.65	7.65	7.30
Alloy bars	6.725	6.725	6.725	6.475
Structural shapes	5.50	5.50	5.50	5.275
Stainless bars (No. 302)	46.75	46.75	46.75	45.00
Wrought iron bars	14.90	14.90	14.90	14.45
Wire: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	7.65¢
Rails: (per 100 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.525
Light rails	6.725	6.725	6.725	6.50
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$77.50
Slabs, rerolling	80.00	80.00	80.00	77.50
Forging billets	99.50	99.50	99.50	96.00
Alloys blooms, billets, slabs	119.00	119.00	119.00	114.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.15¢
Skelp	5.05	5.05	5.05	4.875
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	5.967¢

	July 14 1959	July 7 1959	June 16 1959	July 15 1958
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.57	$70.57	$70.57	$70.97
Foundry, Southern Cin'ti	73.87	73.87	73.87	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.07	70.07	70.07	70.47
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb‡	12.25	12.25	12.25	12.25
Pig Iron Composite: (per gross ton)				
Pig iron	$66.41	$66.41	$66.41	$66.49
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$43.50	$43.50	$42.50	$39.50
No. 1 steel, Phila. area	**39.50**	37.50	37.50	34.50
No. 1 steel, Chicago	*35.50*	36.50	34.50	38.50
No. 1 bundles, Detroit	37.50	37.50	35.50	31.50
Low phos., Youngstown	44.50	44.50	42.50	39.50
No. 1 mach'y cast, Pittsburgh	51.50	51.50	49.50	48.50
No. 1 mach'y cast, Phila.	49.50	49.50	49.50	47.50
No. 1 mach'y cast, Chicago	59.50	59.50	58.50	46.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$39.17	$39.17	$38.17	$37.50
No. 2 bundles	**27.00**	26.67	25.33	26.83
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.50-15.50	$14.50-15.50	$14.50-15.50	$15.38
Foundry coke, prompt	18.50	18.50	18.50	17.50-19
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	31.50	31.50	31.50	25-26.50
Copper, Lake, Conn.	31.50	31.50	31.50	25.00
Tin, Straits, N. Y.	*102.50*†	103.00	104.00	94.00
Zinc, East St. Louis	11.00	11.00	11.00	10.00
Lead, St. Louis	11.80	11.80	11.80	10.80
Aluminum, virgin ingot	26.80	26.80	26.80	26.10
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composites

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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Which Way Will Prices Go?

At present, the market is strong and prices are holding their own.

But once the steel labor situation clears up, anything could happen.

▪ The scrap market stayed strong right up until zero hour in the steel labor crisis.

But a question without an answer gnawed at suppliers and consumers alike: After peace comes to the labor front, will scrap prices go up or down?

There are a number of possibilities. One often-heard theory goes like this: If there is no strike, mills will continue to buy scrap to meet demand of record production in construction, automotive, and other industries. In this case, scrap prices should continue to climb.

On the other hand, some believe that many steel users are overstocked with steel. If there is no strike, these users will fall back on inventories. Consequently, the mill operating rate will drop and so will scrap prices along with it.

Some consumers are inclined to believe that scrap prices will fall if there is a strike. But some dealers feel that once the blast furnaces are shut down, mills will have to take in large amounts of scrap to start up operations after a strike is settled.

Other dealers feel that in the event of a strike of moderate duration, so much material might pile up that the mills could get it for a song. The only thing certain in the scrap market is that export demand will continue strong.

Meanwhile, The IRON AGE No. 1 heavy melting Composite Price is unchanged at $39.17. A $2 rise in Philadelphia was offset by a $2 drop in Chicago.

Pittsburgh — The scrap market was quiet but firm in final days bebore the steel strike deadline. A late railroad list showed most grades up at least $1. Feeling among brokers is that dealer grades will be strong, with or without a steel strike; that mills will have to buy whatever happens. Apart from a few strongly-held accumulations, local yards are low in scrap.

Chicago—Mill delivered prices of most openhearth grades slipped $2 on a flurry of late sales as brokers sold off small amounts of in-transit material. Dealers continue to sit tight on yard stocks. They show little price weakness. Electric furnace, railroad, and cast grades continue strong.

Philadelphia—Openhearth scrap prices jumped from $2 to $4 a ton as domestic mills came into the market. No. 1 heavy melting is up $2 to $39-$40. No. 1 dealer bundles and busheling are also up $2 to $40-$41. No. 2 heavy melting was sold at two prices, $35 and $36, a rise of $3 and $4 respectively. A dock strike continues to tie up export shipments. Some of the material is being diverted to the domestic market. Yard intake is improved.

New York—Domestic activity is quiet but export continues strong. There is much uncertainty over the steel labor situation. Prices are unchanged.

Detroit—With the exception of stainless scrap, which is down $10, prices are unchanged. Brokers have reserved dock space for laying down scrap in the event of a strike. There is enough space available to handle scrap produced in the next 30 days.

Cleveland—Mills have been laying down prime scrap in dealer yards. Shipments against old orders have been held up indefinitely. Mills expect prices to decline during a strike, but dealers expect them to rise.

St. Louis—Movement of scrap is almost at a standstill, but a strong undertone is evident. Machine shop and shoveling turnings advanced $1. Some railroad grades are also up $1. Angle and splice bars rose $1.

Birmingham — The market is strong and active. Foundry grades are particularly active and show signs of becoming scarce. Railroad grades advanced $2. Two- and three-ft automotive scrap is in good demand.

Cincinnati—Cast shipments are going as far as Detroit, Chicago, and Birmingham as foundries reach for material local melters can't use. With local machine tool orders still not rushing, demand for cast is slow.

Buffalo — There are no price changes. The market continues to mark time until the labor situation is settled. Very little material is moving.

Boston — The market is at a standstill. Prices are unchanged. The trade is uncertain over the effects of a strike or a settlement.

West Coast—The export market continues brisk. Six cargoes are scheduled to leave during July for Japan. Prices are unchanged.

Houston—The watch and wait attitude still pervades the market although there is some material moving. An export cargo for Japan was loaded here. With or without a steel strike, the market appears quiet for the next few weeks.

This installation consisting of seven hand-propelled cranes on a flexibly suspended runway is used for stripping wire blocks in a large steel mill.

Note how easy it is with the Cleveland Tramrail design to position the runway at any level or location desired. Likewise, it is extremely simple to dismantle and relocate the equipment to serve some other application, should such ever be necessary.

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SCRAP PRICES *(Effective July 14, 1959)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$43.00 to $44.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 dealer bundles	44.00 to 45.00
No. 1 factory bundles	48.00 to 49.00
No. 2 bundles	29.00 to 30.00
No. 1 busheling	43.00 to 44.00
Machine shop turn.	20.00 to 21.00
Shoveling turnings	27.00 to 28.00
Cast iron borings	26.00 to 27.00
Low phos. punch'gs plate	47.00 to 48.00
Heavy turnings	35.00 to 36.00
No. 1 RR hvy. melting	44.00 to 45.00
Scrap rails, random lgth.	52.00 to 53.00
Rails 2 ft and under	57.00 to 58.00
RR specialties	52.00 to 53.00
No. 1 machinery cast.	51.00 to 52.00
Cupola cast.	45.00 to 46.00
Heavy breakable cast.	43.00 to 44.00
Stainless	
18-8 bundles and solids	230.00 to 235.00
18-8 turnings	115.00 to 120.00
430 bundles and solids	130.00 to 135.00
410 turnings	55.00 to 60.00

Chicago

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 dealer bundles	35.00 to 36.00
No. 1 factory bundles	39.00 to 40.00
No. 2 bundles	24.00 to 25.00
No. 1 busheling	34.00 to 35.00
Machine shop turn.	17.00 to 18.00
Mixed bor. and turn.	19.00 to 20.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	19.00 to 20.00
Low phos. forge crops	50.00 to 51.00
Low phos. punch'gs plate, ½ in. and heavier	47.00 to 48.00
Low phos. 2 ft and under	45.00 to 46.00
No. 1 RR hvy. melting	40.00 to 41.00
Scrap rails, random lgth.	50.00 to 51.00
Rerolling rails	60.00 to 61.00
Rails 2 ft and under	55.00 to 56.00
Angles and splice bars	51.00 to 52.00
RR steel car axles	65.00 to 66.00
RR couplers and knuckles	49.00 to 50.00
No. 1 machinery cast.	59.00 to 60.00
Cupola cast.	52.00 to 53.00
Cast iron wheels	44.00 to 45.00
Malleable	60.00 to 61.00
Stove plate	50.00 to 51.00
Steel car wheels	49.00 to 50.00
Stainless	
18-8 bundles and solids	210.00 to 215.00
18-8 turnings	110.00 to 115.00
430 bundles and solids	115.00 to 120.00
430 turnings	55.00 to 60.00

Philadelphia Area

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	34.00 to 36.00
No. 1 dealer bundles	40.00 to 41.00
No. 2 bundles	26.00 to 28.00
No. 1 busheling	40.00 to 41.00
Machine shop turn.	19.00 to 20.00
Mixed bor. short turn.	19.00 to 20.00
Cast iron borings	19.00 to 20.00
Shoveling turnings	23.00 to 24.00
Clean cast. chem. borings	27.00 to 28.00
Low phos. 5 ft and under	40.00 to 41.00
Low phos. 2 ft punch'gs	42.00 to 43.00
Elec. furnace bundles	41.00 to 42.00
Heavy turnings	33.00 to 34.00
RR specialties	44.00 to 45.00
Rails 18 in. and under	59.00 to 60.00
Cupola cast.	40.00 to 41.00
Heavy breakable cast.	42.00 to 45.00
Cast iron car wheels	45.00 to 46.00
Malleable	67.00 to 68.00
No. 1 machinery cast.	49.00 to 50.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$35.50 to $36.50
No. 2 hvy. melting	30.50 to 31.50
No. 1 dealer bundles	35.50 to 36.50
No. 2 bundles	25.00 to 26.00
Machine shop turn.	19.00 to 20.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	20.00 to 21.00
Low phos. 18 in. and under	44.00 to 45.00
Rails, random length	47.00 to 48.00
Rails, 18 in. and under	55.00 to 56.00
No. 1 cupola cast.	46.00 to 47.00
Hvy. breakable cast.	42.00 to 43.00
Drop broken cast.	52.00 to 53.00

Youngstown

No. 1 hvy. melting	$43.00 to $44.00
No. 2 hvy. melting	29.50 to 30.50
No. 1 dealer bundles	43.00 to 44.00
No. 2 bundles	28.50 to 29.50
Machine shop turn.	18.50 to 19.50
Shoveling turnings	23.50 to 24.50
Low phos. plate	44.00 to 45.00

Cleveland

No. 1 hvy. melting	$39.50 to $40.50
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	39.50 to 40.50
No. 1 factory bundles	45.00 to 46.00
No. 2 bundles	26.00 to 27.00
No. 1 busheling	39.50 to 40.50
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	20.00 to 21.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	20.00 to 21.00
Cut structural & plates, 2 ft & under	45.00 to 46.00
Drop forge flashings	39.50 to 40.50
Low phos. punch'gs plate	40.50 to 41.50
Foundry steel, 2 ft & under	40.00 to 41.00
No. 1 RR hvy. melting	44.00 to 45.00
Rails 2 ft and under	57.00 to 58.00
Rails 18 in. and under	58.00 to 59.00
Steel axle turnings	24.00 to 25.00
Railroad cast.	56.00 to 57.00
No. 1 machinery cast.	54.00 to 55.00
Stove plate	51.00 to 52.00
Malleable	67.00 to 68.00
Stainless	
18-8 bundles	215.00 to 225.00
18-8 turnings	115.00 to 120.00
430 bundles	120.00 to 125.00

Buffalo

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 busheling	33.00 to 34.00
No. 1 dealer bundles	33.00 to 34.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	16.00 to 17.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	17.00 to 18.00
Low phos. plate	40.00 to 41.00
Structurals and plate, 2 ft and under	41.00 to 42.00
Scrap rails, random lgth.	39.00 to 40.00
Rails 2 ft and under	49.00 to 50.00
No. 1 machinery cast.	48.00 to 49.00
No. 1 cupola cast.	44.00 to 45.00

St. Louis

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 dealer bundles	37.00 to 38.00
No. 2 bundles	23.00 to 24.00
Machine shop turn.	14.00 to 15.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	18.00 to 19.00
No. 1 RR hvy. melting	39.00 to 40.00
Rails, random lengths	45.00 to 46.00
Rails, 18 in. and under	50.00 to 51.00
Angles and splice bars	45.00 to 46.00
RR specialties	45.00 to 46.00
Cupola cast.	50.00 to 51.00
Heavy breakable cast.	40.00 to 41.00
Cast iron brake shoes	40.00 to 41.00
Stove plate	45.00 to 46.00
Cast iron car wheels	40.00 to 41.00
Rerolling rails	56.00 to 57.00
Unstripped motor blocks	41.00 to 42.00

Birmingham

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	35.00 to 36.00
No. 1 special bundles	38.00 to 39.00
No. 2 bundles	23.00 to 24.00
No. 1 busheling	38.00 to 39.00
Machine shop turn.	24.00 to 25.00
Shoveling turnings	27.00 to 28.00
Cast iron borings	14.00 to 15.00
Electric furnace bundles	38.00 to 39.00
Elec. furnace, 3 ft & under	36.00 to 37.00
Bar crops and plate	44.00 to 45.00
Structural and plate, 2 ft	43.00 to 44.00
No. 1 RR hvy. melting	37.00 to 38.00
Scrap rails, random lgth.	44.00 to 45.00
Rails, 18 in. and under	50.00 to 51.00
Angles and splice bars	45.00 to 46.00
Rerolling rails	56.00 to 57.00
No. 1 cupola cast.	55.00 to 56.00
Stove plate	55.00 to 56.00
Cast iron car wheels	42.00 to 43.00
Unstripped motor blocks	42.00 to 43.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	25.00 to 26.00
No. 2 dealer bundles	18.00 to 19.00
Machine shop turnings	9.00 to 10.00
Mixed bor. and turn.	11.00 to 12.00
Shoveling turnings	13.00 to 14.00
Clean cast. chem. borings	22.00 to 23.00
No. 1 machinery cast.	37.00 to 38.00
Mixed yard cast.	35.00 to 36.00
Heavy breakable cast.	33.00 to 34.00
Stainless	
18-8 prepared solids	195.00 to 200.00
18-8 turnings	85.00 to 90.00
430 prepared solids	85.00 to 90.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	37.00 to 38.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	37.00 to 38.00
Drop forge flashings	34.00 to 35.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	15.00 to 16.00
Heavy breakable cast.	36.00 to 37.00
Mixed cupola cast.	43.00 to 44.00
Automotive cast.	53.00 to 54.00
Stainless	
18-8 bundles and solids	195.00 to 205.00
18-8 turnings	85.00 to 95.00
430 bundles and solids	85.00 to 95.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$27.00 to $28.00
No. 2 hvy. melting	20.00 to 21.00
No. 1 dealer bundles	27.00 to 28.00
No. 2 bundles	14.00 to 15.00
No. 1 busheling	27.00 to 28.00
Machine shop turn.	10.00 to 11.00
Shoveling turnings	12.00 to 13.00
Clean cast. chem. borings	16.00 to 17.00
No. 1 machinery cast.	35.00 to 36.00
Mixed cupola cast.	33.00 to 34.00
Heavy breakable cast.	32.00 to 33.00
Stove plate	29.00 to 30.00

San Francisco

No. 1 hvy. melting	....	$36.00
No. 2 hvy. melting	....	33.00
No. 1 dealer bundles	....	33.00
No. 2 bundles	....	22.00
Machine shop turn.	....	17.00
Cast iron borings	....	17.00
No. 1 cupola cast.	....	47.00

Los Angeles

No. 1 hvy. melting	$38.00 to	$40.00
No. 2 hvy. melting	36.00 to	38.00
No. 1 dealer bundles	....	35.00
No. 2 bundles	18.00 to	20.00
Machine shop turn.	$16.00 to	17.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	18.00 to	19.00
Elec. furn. 1 ft and under (foundry)	....	49.00
No. 1 cupola cast.	....	45.00

Seattle

No. 1 hvy. melting	....	$35.00
No. 2 hvy. melting	....	33.00
No. 2 bundles	....	22.00
No. 1 cupola cast.	....	36.00
Mixed yard cast.	....	36.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	....	$32.25
No. 2 hvy. melting	....	28.25
No. 1 dealer bundles	....	32.25
No. 2 bundles	....	22.75
Mixed steel scrap	....	24.25
Bush., new fact., prep'd	....	32.25
Bush., new fact., unprep'd	....	26.25
Machine shop turn.	....	14.00
Short steel turn.	....	17.00
Mixed bor. and turn.	....	13.00
Rails, rerolling	....	37.00
Cast scrap	$46.50 to	48.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	....	$34.00
No. 2 hvy. melting	....	31.00
No. 2 bundles	....	20.00
Machine shop turn.	....	16.00
Shoveling turnings	....	20.00
Cut structural plate 2 ft & under	$45.00 to	46.00
Unstripped motor blocks	38.50 to	39.50
Cupola cast.	46.00 to	47.00
Heavy breakable cast.	28.00 to	29.00

While Rome Burned

Even though Egypt had primitive fire engines as early as 2300 years ago, the people of Rome in 64 A.D. watched helplessly while their city burned. Europeans of the Middle Ages, too, forgot what had been learned earlier about fire fighting – in 1500 their equipment included only axes and long iron hooks to pull down building walls.

Volunteer fire brigades using buckets, ladders and hooks were organized in the United States as early as 1657. London's first fire engine, an oblong box mounted on four wheels, was invented in 1731 by Richard Newsham; a fire boat was put into use in New York City in 1800.

Not until 1853 was a fire brigade hired to protect an entire city, when Cincinnati organized such a department. Its "Joe Ross", weighing 22,000 pounds, was the first successful steam fire engine in the world.

To fight the current annual fire losses of more than a billion dollars, millions of tons of iron and steel go into hydrants and water pipes, trucks, pumpers, extinguishers, fire escapes, safety doors and many kinds of small equipment. For these and numberless other demands, an inexhaustible supply of steel must be maintained – and scrap is an indispensable ingredient.

For the purchase

or sale of

iron or steel scrap

. . . phone or write

"Your Chicago Broker"

M. S.
KAPLAN
COMPANY

231 S. La Salle St., Chicago

Telephone ANdover 3-3900

Copper Will Hold Prices Down

Producers aim to hold the price line as a move against competitive metals.

New, lower price, down 1½¢ per lb, strengthens their hands in labor talks.

▪ Copper producers are getting tired of their defensive position against competitive metals. A lot of aggressive plans are being made behind closed doors.

It developed within the various producers independently, but one of the first organized moves will be an all-out attempt to hold down prices. This will be proclaimed initially when aluminum raises its prices later this summer.

The only thing that could put upward pressure on producers' prices would be major strikes. This is not likely.

How Long—Right now the feeling by some in the copper companies is that prices can be kept from raising for at least a year, barring major strikes.

The bristling competitive attitude in copper apparently reaches right to the top of at least several of the major producers. The feeling is that price has cost copper several fringe markets. With one of its major competitors, aluminum, just about committed to a higher price, and copper's profit picture in better shape, several company heads feel now is the time to turn some tables.

Lower Prices—On the short haul there are no apparent obstacles. In fact, when custom smelters began the week with another ½¢ price cut, to 2½¢ below producers, the producers cut their prices. Kennecott dropped 1½¢ per lb, to 30¢ effective July 14. Phelps Dodge quickly followed.

Apparently pressure from producers' customers pushed the price down. But it will be a week or so before the cause and effect will be clear. In the meantime some observers aren't so sure.

They point out that July is the traditional month for copper mills and fabricators to close down for at least part of the month for vacations. Copper shipments always plummet. Some observers say there just aren't enough mills and fabricators buying.

Better Bargaining Position—No matter why producers dropped prices, a major effect will be to strengthen their hands at their individual bargaining tables. The lower prices knock away some of the profits unions had their eyes on.

For what's ahead, many copper sellers are watching steel problems closely. They are more interested in the general attitudes of the top steel management and labor people than in actual strike news.

Says one seller, "In terms of inventories, a short steel strike wouldn't hurt us much. Most of our customers that would be affected have good steel stocks. But they also have good copper stocks. If steel people are glum, their pessimism might spread, and buyers might just stop buying copper to let steel and copper inventories deplete together."

Aluminum

Kaiser is going after big tonnage markets with a new program aimed at "accelerating to full commercial realization the development of major potential market for aluminum." Major feature of the program is a new market development department under John E. Menz, vice president for marketing. Top immediate targets of the new department: Extension of aluminum utilization in automobiles, residential housing; and finding more foil uses.

Reynolds Metals Co. has officially added 33,000 tons to its primary production capacity with the start up of the first of three potlines at its new reduction plant at Massena, N. Y.

The Reynolds plant is right next door to a new Chevrolet foundry which will take about one-third of its metal. Reynolds released pictures of the new potline right up to the door of the Chevrolet plant.

This is no accident. By now it is no secret in the trade that Chevrolet is casting the aluminum engine block for its new light car, the Corvair, at Massena.

Tin prices for the week: July 8—102.875; July 9—102.875; July 10—102.75; July 13—102.50; July 14—102.50.*

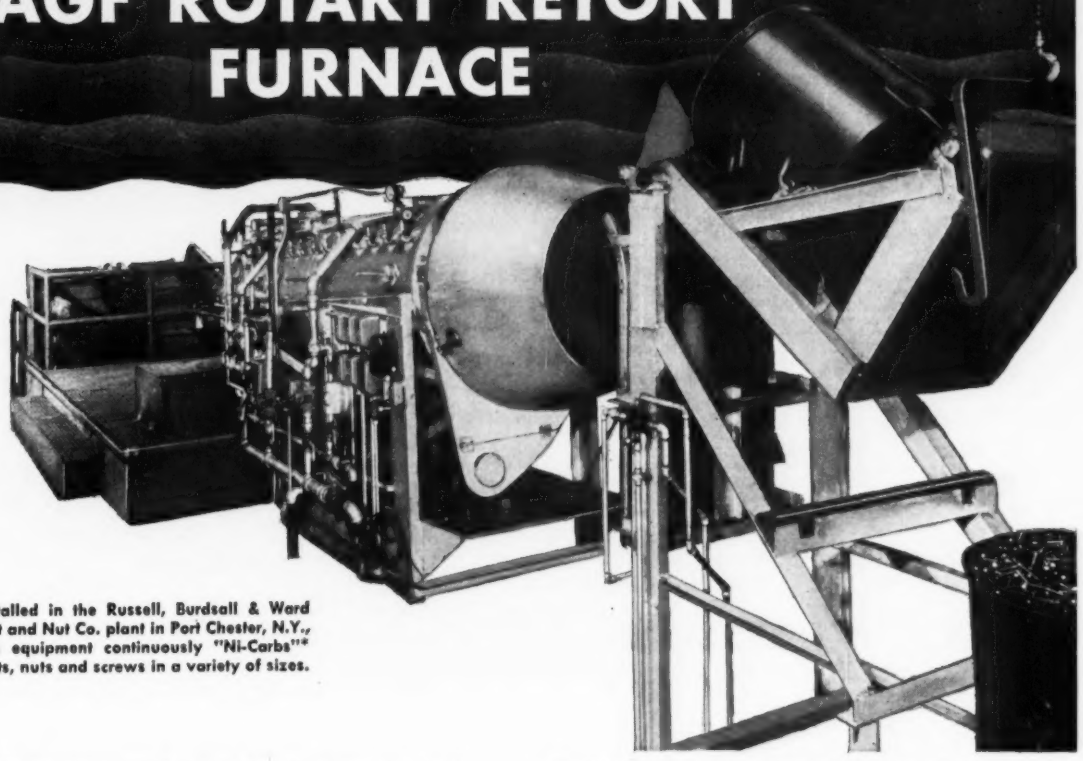
*Estimates.

Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum pig	24.70	24.00	8/1/58
Aluminum ingot	26.80	26.10	8/1/58
Copper (E)	30.00	31.50	7/13/59
Copper (CS)	29.00	29.50	7/13/59
Copper (L)	30.00	31.50	7/13/59
Lead, St. L.	11.80	11.30	5/7/59
Lead, N. Y.	12.00	11.50	5/7/59
Magnesium ingot	36.00	34.50	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	74.00	64.50	12/6/56
Titanium sponge	182-182	185-205	11/3/58
Zinc, E. St. L.	11.00	11.50	2/25/59
Zinc, N. Y.	11.50	12.00	2/25/59

ALUMINUM: 99% ingot frt allwd. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. TIN: See above; Other primary prices, pg. 151.

NOW! Oil or Water COMBINATION QUENCH TANK increases the versatility of the AGF ROTARY RETORT FURNACE



Installed in the Russell, Burdsall & Ward Bolt and Nut Co. plant in Port Chester, N.Y., this equipment continuously "Ni-Carbs"* bolts, nuts and screws in a variety of sizes.

AGF Continuous Rotary Retort Furnaces and Quench Tanks with the NEW "Dual Quench" use—either oil or water—at the flip of a handy control lever. "That's modern heat treating."

VERSATILITY

The illustrated installation of AGF Equipment approaches the ultimate in heat treating efficiency. 400 to 1000 lbs. of bolts, nuts and screws, depending upon the size and the heating cycle need, is the dependable hourly production. A quick change in heating cycle or quench can be instantly made from simple controls.

UNIFORMITY OF PRODUCT is assured by—

- Retort rotation thoroughly mixing the work.
- Positive control and maintenance of atmosphere in the retort.
- Small amounts of work are constantly being quenched as contrasted with other types of atmosphere furnaces where large batches hinder proper quenching.

ECONOMY

The overall economies of operation afforded by AGF Rotary Furnaces result in substantially lower cost per unit of work heat treated than is possible with any other type of furnace.

Safe, clean, fast and easy to use—it will pay you to investigate AGF FURNACES and Dual Quench Tanks.

Send your heat treating problem to AGF "PIONEER" furnace builders and ask for AGF AUTOMATIC FURNACE DATA.

**The Original Ammonia-Gas Case Hardening Process.*

AMERICAN GAS FURNACE CO.
1004 LAFAYETTE ST., ELIZABETH 4, N. J.

Start saving money right now on threading jobs like these with...

COUPLING - STAINLESS 316
1.25 N.P.T.
THREADING TIME - 3 MIN. 54 SECS.
SINK FLANGE - STAINLESS
3.241 IN. DIA. - 10 TPI
THREADING TIME - 37 SECONDS
LIFT NUT - STEEL B-1112
1.406 IN. DIA. - 4 TPI
THREADING TIME - 39 SECONDS
BODY - STAINLESS STEEL
1.25 IN. DIA. - 24 TPI
THREADING TIME - 7 SECONDS
ADAPTOR - ZINC ALLOY
11 TPI-INT. 16 TPI-EXT. SIMULTANEOUS
THREADING TIME - 12 SECONDS
SCROLL - A.I.S.I. 4150
.500 LEAD
THREADING TIME - 8 MIN. 15 SECS.
FOCUSING NUT - ALUMINUM
1 IN. DIA. - 16 TPI 6 START
THREADING TIME - 25 SECONDS
CONNECTOR - STEEL C-1117
.75 IN. DIA. - 20 TPI
THREADING TIME - 7 SECONDS
FUEL NOZZLE - AMS-5640
1.040 IN. DIA. - 12 TPI
THREADING TIME - 12 SECONDS
STUD - SAE 4140 - RC-41
.5625 IN. DIA. - 18 TPI
THREADING TIME - 12 SECONDS
SCREW - MILD STEEL
1.084 IN. DIA. 1 IN. LEAD - 3 START
THREADING TIME - 84 SECONDS
COUPLING - ALUMINUM
1.9375 IN. DIA. - 10 TPI
THREADING TIME - 11 SECONDS
NOZZLE - AMS-5640
1 IN. DIA. - 28 TPI
THREADING TIME - 6 SECONDS
WORM - MILD STEEL
.9583 IN. DIA. 28 D.P. - 8 START
THREADING TIME - 3 MIN. 20 SECS.
VALVE STEM - BRASS
2 START 10 TPI STUB ACME
THREADING TIME - 23 SECONDS
STUD - TITANIUM
.25 IN. DIA. - 28 TPI
THREADING TIME - 20 SECONDS
LIFT SCREW - STEEL B-1112
1.280 IN. DIA. - 4 TPI
THREADING TIME - 23 SECONDS

CRI-DAN SINGLE-POINT THREADING LATHES

...cut costs with simple single-point carbide tools. They're easily resharpened or replaced. They eliminate expensive upkeep of thread milling cutters or thread grinding wheels.

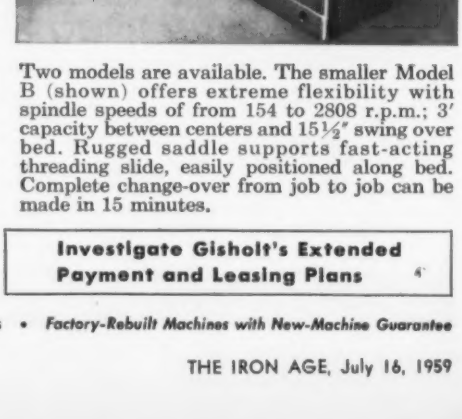
...assure extremely accurate lead and thread form and exceptional finish with low-cost carbide tools on materials that don't allow economical threading by other methods.

...handle any material from titanium or toughest alloy steels to brass and other non-ferrous metals with a wide selection of spindle speeds and feeds to meet all job requirements.

...set up fast to produce single- or multiple-start, coarse or fine, left- or right-hand threads, parallel or tapered with metric or inch pitches—thread up to shoulders on all types of internal and external operations.

...cut costs from start to finish with CRI-DAN's speed, versatility and economy.

Why put off the savings the CRI-DAN method can bring you *right now*? Ask your Gisholt Representative for complete details. Or write us for literature or cost estimates on your particular work.



Two models are available. The smaller Model B (shown) offers extreme flexibility with spindle speeds of from 154 to 2808 r.p.m.; 3' capacity between centers and 15½" swing over bed. Rugged saddle supports fast-acting threading slide, easily positioned along bed. Complete change-over from job to job can be made in 15 minutes.

Investigate Gisholt's Extended Payment and Leasing Plans

GISHOLT MACHINE COMPANY
Madison 10, Wisconsin

Turret Lathes • Automatic Lathes • Balancers • Superfinishers • Threading Lathes • *Factory-Rebuilt Machines with New-Machine Guarantee*

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship pt., frt. allowed)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.032	.081	.136 .249	.250-3.
1100, 3003	45.7	43.8	42.8	43.3
5052	53.1	48.4	46.9	46.0
6061-0	50.1	45.7	43.9	44.9

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6- 8	42.7-44.2	51.1-54.8
12-14	42.7-44.2	52.0-56.5
24-26	43.2-44.7	62.8-67.5
36-38	46.7-49.2	86.9-90.5

Screw Machine Stock—2011-T-3

Size"	¼	⅜-⅝	⅝-1	1¼-1½
Price	62.0	61.2	59.7	57.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.411	$1.884	$2.353	$2.823
.024 gage	1.762	2.349	2.937	3.524

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93 3	95.7	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	138	120	138
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	130	110	126
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	55.63	.....	52.86	55.82
Brass, Yellow	48.24	48.75	48.18	51.05
Brass, Low	51.23	51.77	51.17	54.54
Brass, R L	52.29	52.83	52.23	55.60
Brass, Naval	52.80	.....	46.61	56.21
Muntz Metal	50.85	.....	46.16	.....
Comm. Bz.	53.90	54.44	53.84	56.96
Mang. Bz.	56.54	.....	50.14	.....
Phos. Bz. 5%	75.34	.....	75.84	.....

Free Cutting Brass Rod 32.73

TITANIUM

(Base prices, f.o.b. mill)

Sheet and strip, commercially pure, $7.25-$8.50; alloy, $13.40-$17.00, Plate, HR, commercially pure, $5.25-$6.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.75-$6.25; alloy, $7.75-$10.00; Bar, HR or forged, commercially pure, $4.25-$5.00; alloy, $4.25-$7.50; billets, HR, commercially pure, $3.55-$4.10; alloy, $3.55-$5.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 29.50
Beryllium Aluminum 5% Be, Dollar per lb contained Be $74.75
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.30
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic basis... $ 1.31
Cobalt, 97-99% (per lb.) ... $1.75 to $1.82
Germanium, per gm, f.o.b. Miami, Okla., refined ..... 33.30 to 42.00
Gold, U. S. Treas., per troy oz..... $35.00
Indium, 99.9%, dollars per troy oz.. $ 2.25
Iridium, dollars per troy oz. ... $75 to $85
Lithium, 98% ..... $11.00 to $14.00
Magnesium sticks, 100 to 500 lb.... 59.00
Mercury, dollars per 76-lb flask f.o.b. New York ..... $238 to $240
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz.. $18 to $20
Platinum, dollars per troy oz.. $77 to $80
Rhodium ..... $120.00 to $125.00
Silver ingots (¢ per troy oz.) 91.375
Thorium, per kg. $43.00
Vanadium ..... $ 3.45
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 29.25
- No. 120 ..... 28.00
- No. 123 ..... 27.00

80-10-10 ingot
- No. 305 ..... 33.50
- No. 315 ..... 31.50

88-10-2 ingot
- No. 210 ..... 42.00
- No. 215 ..... 37.75
- No. 245 ..... 33.50

Yellow ingot
- No. 405 ..... 23.75

Manganese bronze
- No. 421 ..... 26.75

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
- 0.30 copper max. 25.00-25.25
- 0.60 copper max. 24.75-25.00

Piston alloys (No. 122 type).. 26.75-27.75
No. 12 alum. (No. 2 grade)... 23.50-24.00
108 alloy 24.00-24.50
195 alloy 26.50-27.50
13 alloy (0.60 copper max.)... 24.75-25.00
AXS-679 (1 pct zinc) 23.75-24.75

Steel deoxidizing aluminum notch bar granulated or shot

Grade 1—95-97½% 22.50-23.50
Grade 2—92-95% 21.25-22.25
Grade 3—90-92% 20.25-21.25
Grade 4—85-90% 17.50-18.50

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	27½	26¾
Yellow brass	20⅝	18¾
Red brass	24¼	23½
Comm. bronze	25⅛	24⅜
Mang. bronze	19¼	18⅝
Free cutting rod ends.	20½	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	24¼
No. 2 copper wire	22¾
Light copper	20½
*Refinery brass	22¼
Copper bearing material	21¼

*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	24¼
No. 2 copper wire	22¾
Light copper	20½
No. 1 composition	19¼
No. 1 comp. turnings	19½
Hvy. yellow brass solids	14½
Brass pipe	15½
Radiators	15¾

Aluminum

Mixed old cast.	13½—14½
Mixed new clips	16 —17
Mixed turnings, dry	14 —15

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire	22 —22½
No. 2 copper wire	20 —20½
Light copper	18 —18½
Auto radiators (unsweated)	12¾—13¼
No. 1 composition	17 —17½
No. 1 composition turnings	15½—16
Cocks and faucets	13 —13½
Clean heavy yellow brass	11½—11¾
Brass pipe	13 —13½
New soft brass clippings	14 —14½
No. 1 brass rod turnings	11¼—11¾

Aluminum

Alum. pistons and struts	7 — 7½
Aluminum crankcase	10¾—11¼
1100 (2s) aluminum clippings	14½—15
Old sheet and utensils	10¾—11¼
Borings and turnings	6½— 7
Industrial castings	10¾—11¼
2020 (24S) clippings	12 —12½

Zinc

New zinc clippings	4¾— 5¼
Old zinc	3¼— 3½
Zinc routings	2 — 2¼
Old die cast scrap	1⅝— 2

Nickel and Monel

Pure nickel clippings	52-54
Clean nickel turnings	37-40
Nickel anodes	52-54
Nickel rod ends	52-54
New Monel clippings	30-32
Clean Monel turnings	30-32
Old sheet Monel	26-28
Nickel silver clippings, mixed	18
Nickel silver turnings, mixed	15

Lead

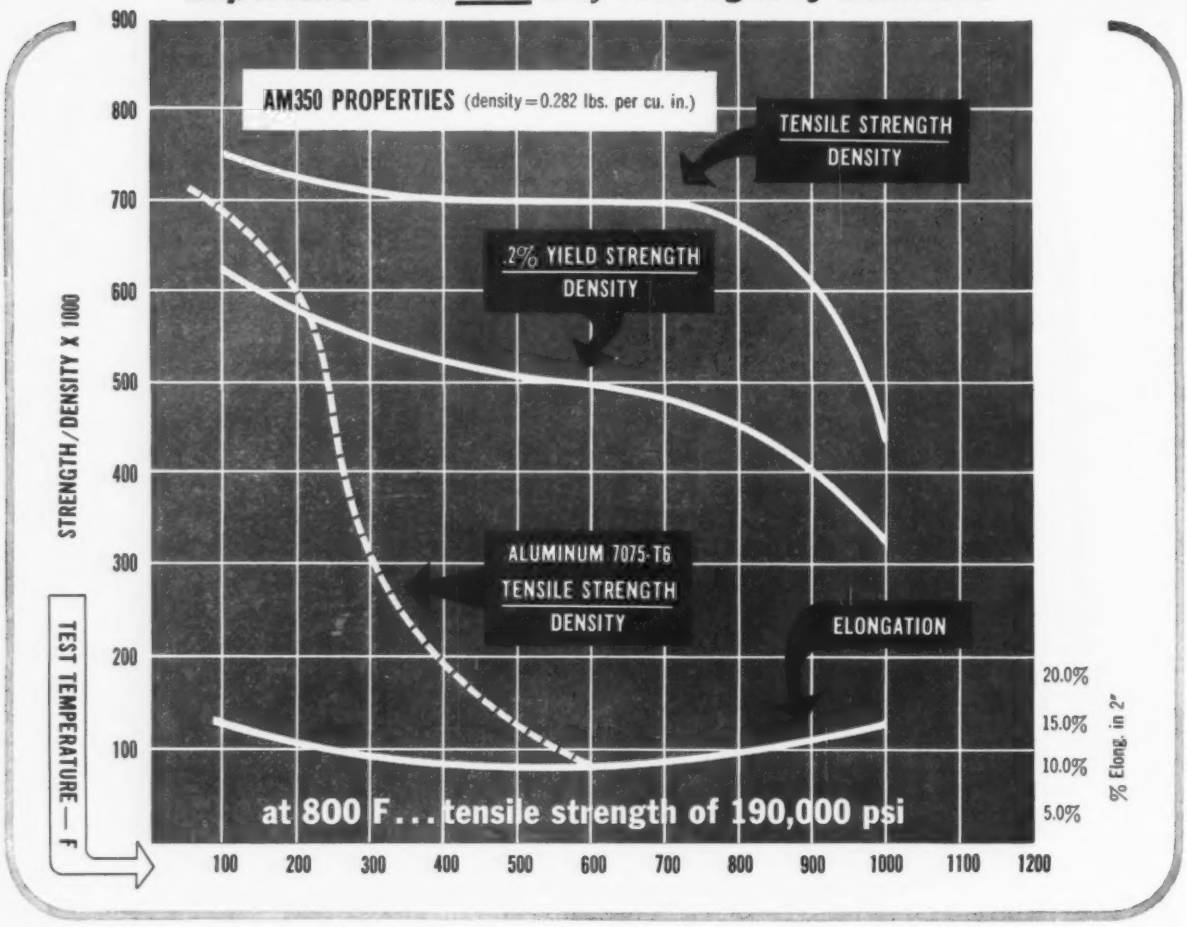
Soft scrap lead	7 — 7¼
Battery plates (dry)	2 — 2¼
Batteries, acid free	1⅞— 2⅛

Miscellaneous

Block tin	77 —78
No. 1 pewter	59 —60
Auto babbitt	40 —41
Mixer common babbitt	9½—10
Solder joints	13¼—13¾
Siphon tops	42
Small foundry type	9½—10
Monotype	9½—10
Lino. and stereotype	8½— 9
Electrotype	7 — 7½
Hand picked type shells	5¼— 5¾
Lino. and stereo. dross	2¼— 2¾
Electro dross	2¼— 2¾

(Effective July 13, 1959)

Experience—*the extra alloy in* **Allegheny Stainless**



Here are the facts on AM350 and AM355, Allegheny Ludlum's precipitation hardening stainless steels

A unique combination of highly desirable properties is the usual description of Allegheny Stainless AM350 and AM355 Steels. They combine high strength at both room and elevated temperatures, excellent corrosion resistance, ease of fabrication, low temperature heat treatment, good resistance to stress corrosion.

They are proving the answer to many problems of the air age. Airframe and other structural parts, pressure tanks, power plant components, high pressure ducting, etc. are all natural missile and supersonic aircraft applications for AM350 and AM355.

Availability: AM350, introduced several years ago, is available commercially in sheet, strip, foil, small bars and wire. AM355, best suited for heavier sections, is available in forgings, forging billets, plate, bar and wire.

Corrosion resistant: Being stainless steels, these alloys resist corrosion and oxidation. Compared to the older, more familiar stainless grades, their corrosion rating is better than the hardenable grades (chromium martensitic) but generally less than the old corrosion resistant standbys, the 18 and 8's. Stress corrosion is resisted at much higher hardness levels than with martensitic stainless.

Simple heat treatment: High strength is developed by two methods, both involving less than ordinary temperatures and minimizing oxidation and distortion problems. The most popular, and one that develops slightly better properties, is the Allegheny Ludlum developed sub-zero cooling and tempering (SCT condition). The material is held at minus 100 F for 3 hrs plus 3 hrs at 850 F. Alternate method is Double Aged (DA): 2 hrs at 1375 F plus 2 hrs at 850 F.

Easy fabrication: AM350 and AM355 can be spun, drawn, formed, machined and welded using similar procedures as with the 18-8 stainless types. In the hardened condition (SCT & DA) some forming may be done . . . 180 degree bend over a 3T radius pin. Also it can be dimpled in the hard condition to insure accurate fit-up.

For further information, see your A-L sales engineer or write for the booklet "Engineering Properties, AM350 and AM355." *Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa.* Address Dept. A-191.

WSW 7327

ALLEGHENY LUDLUM

Export distribution: AIRCO INTERNATIONAL

EVERY FORM OF STAINLESS . . . EVERY HELP IN USING IT

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3, R3*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*		5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Bridgeport, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3,* $114.00 *T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1,T8, M8*	7.575 *W8*		8.40 *W8, S9,13*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1,P11*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Ohio Sharon, Pa.		$99.50 *S1,* *C10*	$119.00 *C10,S1*					5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3,B4* 7.525 *E3*			8.40 *S9*	15.55 *S9*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W3*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*			6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

(Effective July 13, 1959)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str Low Alloy C.R	Hi Str Low Alloy Galv.		Cokes* *1.25*-lb. base box	Electro** *0.25*-lb. base box	Hollowware Enameling *29* ga.
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price, 0.75 lb./0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*			$10.50 *U1*	$9.20 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*			7.525 *B3*	9.275 *B3*	10.025 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	
	Worcester, Mass.									6.70 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*						
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A1*	6.275 *A1*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3*	6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1, Y1*	7.85 *U1, Y1*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*	6.875 *G2*							$9.20 *G2*	7.95 *G2*
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.225 *E2*							
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1**, *R3*	7.525 *R3, S1*	9.275 *R3,*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Donora, Aliquippa, McKeesport, Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.025 *U1, J3*	6.40 *A5, J3, P6*	$10.40 *W5, J3*	$9.10 *U1, J3*	7.85 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	7.85 *W5*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*	7.50 *J3**	6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2, R3*	$10.50 *T2*	$9.20 *T2*	
	Houston, Texas									6.65 *S2*			

*Electrogalvanized sheets.

(Effective July 13, 1959)

*7.425 at Sharon-Niles is 7.225

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *C4*		7.50 *C4*	7.95 *C4*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Harrisburg, Pa.							5.30 *P2*	6.375 *P2*			
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Fairless, Pa.	5.825 *U1*	5.825 *U1*		6.875 *U1*							
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7,A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3* 6.475 *T5*	9.025 *R3,R2* 8.775 *T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875 *L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,I3*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8,B5* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5* 9.225 *B5,P3, P8*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5.675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, I1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*					5.30 *N4*				8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.30 *W5*				
	Youngstown, Ohio	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, S12*	8.625 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				8.675 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10*				8.675 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.875 *A8*	5.675 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective July 13, 1959) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B. Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mas.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Steel Corp., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

STANDARD T. & C.	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50								
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50								
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Fontana *K1*	*6.25		*2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50								
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11.00¢ per lb.

(Effective July 13, 1959)

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*L4, C4, A3, J2*) 10 pct	Plate (*L4, C4, A3, J2*) 15 pct	Plate (*L4, C4, A3, J2*) 20 pct	Sheet (*I2*) 20 pct
Stainless Type	302	.....	.....	.....	37.50
	304	28.80	31.55	34.30	40.00
	316	42.20	46.25	50.25	58.75
	321	34.50	37.75	41.05	47.25
	347	40.80	44.65	48.55	57.00
	405	24.60	26.90	29.25	.....
	410	22.70	24.85	27.00	.....
	430	23.45	25.65	27.90	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 43.15; 1 side, 36.20.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.75	6.725	7.25	.....	.....	.....
Cleveland *R3*	.....	.....	.....	.....	.....	15.35
So. Chicago *R3*	.....	.....	.....	10.10	.....	.....
Ensley *T2*	5.75	6.725	.....	.....	.....	.....
Fairfield *T2*	.....	6.725	.....	10.10	6.875	.....
Gary *U1*	5.75	.....	.....	.....	6.875	.....
Huntington, *C16*	.....	6.725	.....	.....	.....	.....
Ind. Harbor *I3*	.....	.....	.....	10.10	.....	.....
Johnstown *B3*	.....	6.725	.....	.....	.....	.....
Joliet *U1*	.....	.....	7.25	.....	.....	.....
Kansas City *S2*	.....	.....	.....	10.10	.....	15.35
Lackawanna *B3*	5.75	6.725	7.25	.....	6.875	.....
Lebanon *B3*	.....	.....	7.25	.....	.....	15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *P5*	.....	.....	.....	.....	.....	14.75
Pittsburgh *J3*	.....	.....	.....	10.10	.....	.....
Seattle *B2*	.....	.....	.....	.....	6.75	15.85
Steelton *B3*	5.75	.....	7.25	.....	6.875	.....
Struthers *Y1*	.....	.....	.....	10.10	.....	.....
Torrance *C7*	.....	.....	.....	.....	6.75	.....
Williamsport *S5*	.....	6.725	.....	.....	.....	.....
Youngstown *R3*	.....	.....	.....	10.10	.....	.....

COKE

	Net-Ton
Furnace, beehive (f.o.b.) Connellsville, Pa.	$14.50 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Detroit f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearney, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	34.35
Erie, Pa., f.o.b.	32.00
Cleveland, del'd	34.19
Cincinnati, del'd	32.84
St. Paul, f.o.b.	31.25
St. Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1959 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	.....	9.875	.....
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor	.....	12.475	.....
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30	Grain Oriented	
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Aliquippa (*J3*); Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*S1*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	GRAPHITE Length (In.)	GRAPHITE Price	CARBON* Diam. (In.)	CARBON* Length (In.)	CARBON* Price
24	84	27.25	40	100,110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12.55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

Super duty, Mo., Pa., Md., Ky.	$185.00
High duty (except Salina, Pa., add $5.00)	140.00
Medium duty	125.00
Low duty (except Salina, Pa., add $2.00)	103.00
Ground fire clay, net ton, bulk	22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$158.00
Childs, Hays, Latrobe, Pa.	163.00
Chicago District	168.00
Western Utah	183.00
California	165.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	163.00-168.00
Silica cement, net ton, bulk, Latrobe	29.75
Silica cement, net ton, bulk, Chicago	26.75
Silica cement, net ton, bulk, Ensley, Ala.	27.75
Silica cement, net ton, bulk, Mt. Union	25.75
Silica cement, net ton, bulk, Utah and Calif.	39.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt.	$109.00
Standard chemically bonded, Curtiner, Calif.	119.00
Burned, Balt.	103.00

Magnesite Brick

Standard, Baltimore	$140.00
Chemically bonded, Baltimore	119.00

Grain Magnesite

St. ⅝ to ½-in. grains

Domestic, f.o.b. Baltimore in bulk.	$73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in:	
Pa., W. Va., Ohio	$16.75
Missouri Valley	15.60
Midwest	17.00

(Effective July 18, 1959)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3***	173	190	...	...	190	9.00	9.675
Atlanta *A8***	175	192	...	214	198	8.75	9.425
Bartonville *K2***	175	192	178	214	198	9.10	9.775
Buffalo *W6*	.....	.....	.....	.....	.....	9.00	9.55*
Chicago *N4***	177	190	172	212	196	9.00	9.70
Chicago *R3*	.....	.....	.....	.....	.....	9.00	9.55
Cleveland *A6*	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	9.00	.....
Crawf'dsv. *M4***	175	192	...	214	198	9.10	9.775
Donora, Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	...	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	.....	.....	.....	.....	.....
Houston *S2*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	184-1	197	...	219	203	9.10	9.775
Johnstown *B3***	173	190	174	...	196	9.00	9.675
Joliet, Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9*	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	.....	.....	.....	.....	.....	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Monessen *P6*	.....	.....	.....	.....	193	8.65	9.325
Palmer, Mass. *W6*	.....	.....	.....	.....	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	...	...	213	9.60	10.15
Rankin, Pa. *A5*	173	187	...	...	193	9.00	9.55
So. Chicago *R3*	173	187	...	...	193	8.65	9.20
S. San Fran. *C6*	.....	.....	.....	236	...	9.95	10.50†
SparrowsPt. *B3***	175	.....	...	214	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.65	9.20
Worcester *A5*	179	.....	.....	.....	.....	9.30	9.85
Williamsport *S5*	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 11-12¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Anderson, Ind. *G4*	8.95	10.40	12.60	15.60	18.55
Baltimore, Md. *T8*	9.50	10.70	12,90	15.90	18.85
Bristol, Conn. *W12*	.....	10.70	12,90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70	.....	.....
Detroit *D1*	9.05	10.50	12.70	15.70	.....
Detroit *D2*	9.05	10.50	12.70	.....	.....
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60	.....	.....
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*	.....	.....	12.90	16.10	19.30
Indianapolis *R5*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	.....
New Britain, Conn. *S7*	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	.....
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	.....
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*	.....	10.70	12.90	16.10	19.30
Wallingford *W1*	9.40	10.70	12.90	15.90	18.55
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *R5*	9.10	10.55	12.60	15.60	18.55

BOILER TUBES

$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
Babcock & Wilcox	2	13	40.28	47.21	35.22
	2½	12	54.23	63.57	47.43
	3	12	62.62	73.40	54.77
	3½	11	73.11	85.70	63.93
	4	10	97.08	113.80	85.53
National Tube	2	13	40.28	47.21	35.22
	2½	12	54.23	63.57	47.43
	3	12	62.62	73.40	54.77
	3½	11	73.11	85.70	63.93
	4	10	97.08	113.80	85.53
Pittsburgh Steel	2	13	40.28	47.21	.....
	2½	12	54.23	63.57	.....
	3	12	62.62	73.40	.....
	3½	11	73.11	85.70	.....
	4	10	97.08	113.80	.....

METAL POWDERS

Cents per lb, minimum truckload, delivered E. of Miss. River, unless otherwise noted.

Iron Powders

Compacting Powders

Electrolytic, imported, f.o.b.	29.50 to 33.00
Electrolytic, domestic	34.50
Sponge	11.25
Atomized	11.25
Hydrogen Reduced	11.25 to 12.00
Carbonyl	88.00
Welding Powders*	8.10
Cutting and Scarfing Powders*	9.10

Copper Powders

Electrolytic, domestic	41.00
Precipitated	40.50 to 45.00
Atomized	39.80 to 48.30
Hydrogen reduced, f.o.b.	43.25
Bronze	47.20 to 51.50
Chromium, electrolytic	$5.00
Lead	19.00
Manganese, f.o.b.	42.00
Molybdenum	$3.60 to $3.95
Nickel	$1.05 to $1.03
Nickel Silver	53.50
Nickel Steel	13.00
Solder	13¢ plus metal value
Stainless Steel, 302	$1.07
Stainless Steel, 316	$1.26
Steel, atomized, prealloyed, 4600 series	14.00 plus metal value
Tin	14¢ plus metal value
Titanium, 99.25+%, per lb., f.o.b.	$11.25
Tungsten	$3.15 (nominal)

* F.O.B., shipping point.

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Pct. Discounts

Bolts	1-4 Containers	5 Containers	20,000 Lb.	40,000 Lb.
Machine ½" and smaller x 3" and shorter	55	57	61	62
⅝" diam. x 3" and shorter	47	49½	54	55
¾" thru 1" diam x 6" and shorter	37	39½	45	46
¾" thru 1" diam. longer than 6" and 1⅛" and larger x all lengths	31	34	40	41
Rolled thread, ½" and smaller x 3" and shorter	55	57	61	62
Carriage, lag, plow, tap, blank, step, elevator and fitting up bolts ½" and smaller x 6" and shorter	48	50½	55	56

Note: Add 25 pct for less than container quantity. Distributor prices are 5 pct less on bolts and square nuts.

Nuts, Hex, HP reg. & hvy.	Full case or Keg price
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½

C. P. Hex, reg. & hvy.	
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½

Hot Galv. Hex Nuts (All Types)	
¾ in. and smaller	41

Semi-finished Hex Nuts	
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½

(Add 25 pct for broken case or keg quantities)

Finished	
⅞ in. and smaller	65

Rivets	*Base per 100 lb*
½ in. and larger	$12.85
	Pct. Off List
7/16 in. and smaller	15

Cap Screws *Discount (Packages)*

Full Finished H. C. Heat Treat

New std. hex head, packaged	Full Case
⅝" diam. and smaller x 6" and shorter	54
¾", ⅞", and 1" diam. x 6" and shorter	38
⅝" diam. and smaller x longer than 6"	..
¾", ⅞", and 1" diam. x longer than 6"	..

C-1018 Steel Full-Finished Cartons	Bulk
42	
23	
..	
..	

¼" through ⅝" dia. x 6" and shorter	59	48
¾" through 1" dia. x 6" and shorter	45	32

Minimum quantity—¼" through ⅜" diam., 15,000 pieces; 7/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

	Discount Mach. Screws	Stove Bolts
Plain Finish Cartons	60	60
Bulk *Quantity*		
To ¼" diam. incl. 25,000-and over	60	..
5/16 to ½" diam. incl. 15,000-200,000	60	..

Machine Screws & Stove Bolt Nuts

	Discount Hex	Square
In Cartons	16	19
In Bulk *Quantity*		
⅜" diam. & smaller 25,000-and over	15	16

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Rolled elliptical, 18 in. or longer, 5000 lb lots	46.00
Electrodeposited	38.00
Brass, 80-20, ball anodes, 2000 lb or more	51.50
Zinc, ball anodes, 2000 lb lots	18.00
(for elliptical add 1¢ per lb)	
Nickel, 99 pct plus, rolled carton, 5000 lb	1.0225
(Rolled depolarized add 3¢ per lb)	
Cadmium	1.20
Tin, ball anodes $1.05 per lb (approx.).	

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	65.90
Copper sulphate, 100 lb bags, per cwt.	22.75
Nickel salts, single, 100 lb bags	36.00
Nickel chloride, freight allowed, 100 lb	45.00
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums	23.70
(Philadelphia price 24.00)	
Zinc cyanide, 100 lb	60.75
Potassium cyanide, 100 lb drum N. Y.	45.50
Chromic acid, flake type, 10,000 lb or more	30.44

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.5
Chicago	140.9
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

STEEL SERVICE CENTERS

Metropolitan Price, dollars per 100 lb.

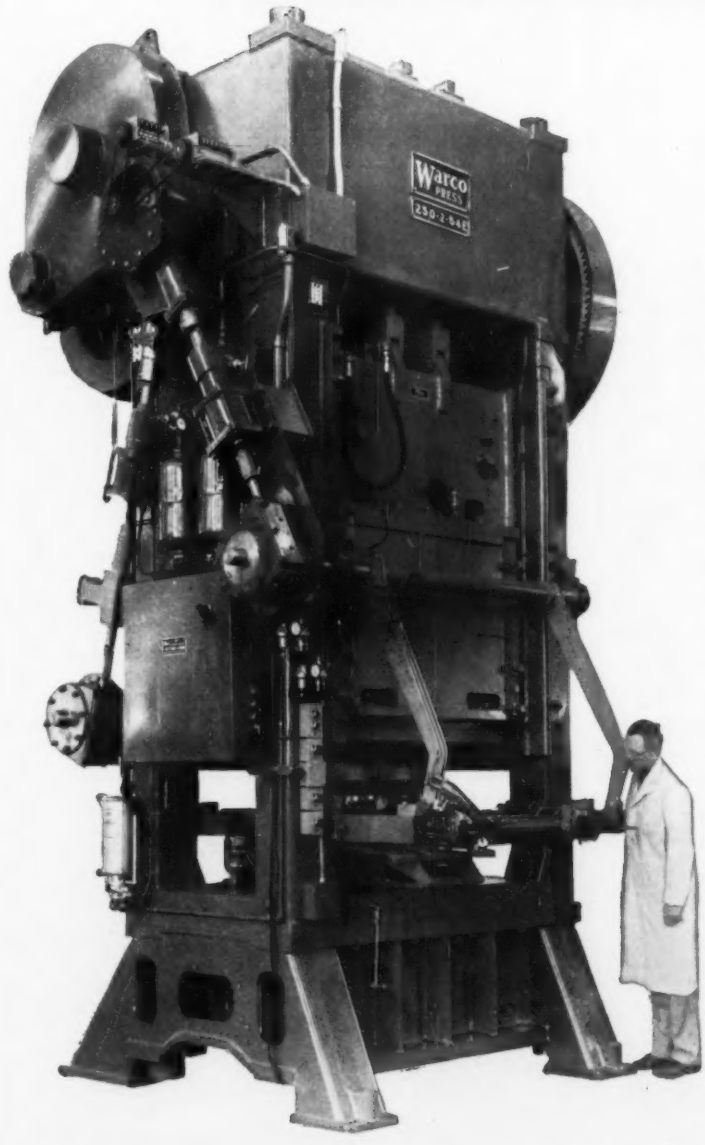
Cities	City Delivery‡ Charge	Sheets: Hot-Rolled (18 ga. & hvr.)	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (18 gage)††	Strip: Hot-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled (merchant)	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		8.59	9.87	10.13	8.91	9.29	9.40	9.39	13.24*	.....	.....	.....	.....
Baltimore	$.10	8.65	9.35	9.09	9.15	9.10	9.65	9.55	11.80*	16.28	15.28	19.82	19.08
Birmingham		8.18	9.45	10.46	8.51	8.89	9.00	8.99	.....	.....	.....	.....	.....
Boston**	.10	10.22[1]	11.27[2]	12.07[3]	12.17[4]	10.42[5]	10.72[6]	10.34[7]	13.45*	16.79	15.79	20.29	19.54
Buffalo	.15	8.55	9.75	11.00	8.90	9.35	9.40	9.30	11.60*	16.34	15.55	19.01	19.30
Chicago**	.15	8.39[1]	9.60	11.05	10.35[4]	8.62[5]	9.16[6]	8.79[7]	9.30	16.20	15.20	19.70	18.95
Cincinnati**	.15	8.56[1]	10.41[2]	11.10	10.67[4]	9.00[5]	9.84[6]	9.11[7]	11.68*	16.52	15.52	20.02	19.27
Cleveland**	.15	8.32[1]	9.61[2]	11.16[3]	10.36[4]	8.76[5]	9.63[6]	9.36[7]	11.40*	16.31	15.31	19.81	19.06
Denver	.20	9.60	11.84	12.94	9.63	9.96	10.04	10.00	11.19	.....	.....	.....	20.84
Detroit**	.15	8.65[1]	10.61[2]	11.40	10.72[4]	8.99[5]	9.84[6]	9.10[7]	9.66	15.46	15.48	18.81	19.23
Houston		8.10	8.60	.....	8.15	8.45	8.05	8.10	11.60	16.20	15.25	19.65	18.95
Kansas City	.15	9.02	10.27	11.37	9.33	9.71	9.82	9.81	10.22	16.87	15.87	20.37	19.62
Los Angeles		8.70[8]	11.20-11.80	12.20	9.15	9.10	9.00	9.10	12.95	17.30	16.35	21.30	20.60
Memphis	.15	8.55	9.80	.....	8.60	8.93	9.01	8.97	12.11*	.....	.....	.....	.....
Milwaukee**	.15	8.53[1]	9.74	11.19	10.49[4]	8.76[5]	9.30[6]	8.93[7]	9.54	16.34	15.34	19.84	19.09
New York	.10	9.27	10.59	11.40	9.74	9.87	9.84	10.09	13.35*	16.16	15.60	20.10	19.35
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia	.10	8.30	9.35	10.71	9.35	9.25	9.20	9.50	12.05*	16.58	15.58	20.08	19.33
Pittsburgh**	.15	8.32[1]	9.61[2]	10.95[3]	10.36[4]	8.52[5]	9.24[6]	8.62[7]	11.40*	16.20	15.20	19.70	18.95
Portland		10.00	11.75	13.30	11.95	11.50	11.10	9.85	15.30*	18.50	17.45	20.75	20.25
San Francisco	.10	9.75	11.20[9]	11.50	9.85	10.10	9.95	10.25	13.70	17.05	16.35	21.05	20.60
Seattle		10.30	11.55	12.50	10.25	10.10	10.20	10.50	14.70	17.15	16.80	20.65	20.60
Spokane	.15	10.45	11.70	10.90	10.65	10.25	10.35	11.15	14.85	17.75	16.95	21.55	20.75
St. Louis**	.15	9.07[1]	9.98	11.02	10.73[4]	9.00[5]	9.76[6]	9.17[7]	9.93	16.58	15.58	20.08	19.33
St. Paul	.15	8.94	9.31	10.47	8.99	9.45	9.53	9.70	11.49	.....	15.41	.....	19.21

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. ** Prices based on 2000 lb item quantities except for galv. sheet, c-f and alloy bars.

†† 10¢ zinc. ‡ Deduct for country delivery. * C1018—1 in. rounds. [1] 10 ga. x 36 x 96 —120; [2] 20 ga. x 36 x 96 —120; [3] 10 ga. x 36 —120; [4] ⅛" x 1"; [5] ¼" x 84"; [6] I-Beams 6 x 12.5; [7] Rounds—¾-2 15/16"; [8] 15 ga. & heavier; [9] 14 ga. & lighter.

(Effective July 13, 1959)

Warco automation



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For Concrete Reinforcing Bars

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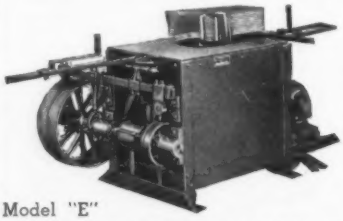

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Steel, brass, copper, monel, bronze, aluminum, zinc, tinplate, lead, stainless steel, coated metals, bonded materials, plastics and paper punched as required and for all kinds of screens.

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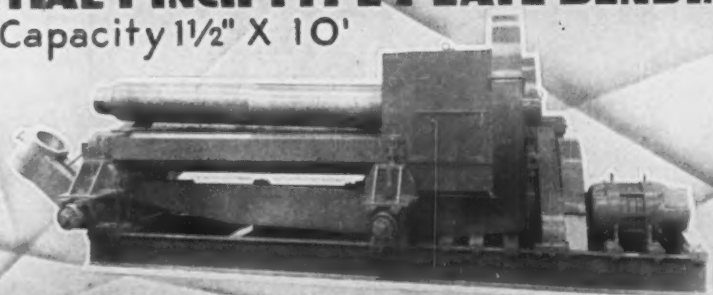

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Light and heavy machinery for all classes of sheet metal, plate and structural work

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PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	.....
Birmingham *R3*	62.00	62.50*	.....	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	.....
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Everett *M6*	67.50	68.00	68.50	.....	.....
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	.....
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31–0.69 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4* (Globe Div.), $78.00; Niagara Falls (15.01–15.50), $101.00; Keokuk (14.01–14.50), $103.50; (15.51–16.00), $106.50. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 18 pct. Add $1.25 for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.); $64.00. Add $1.00 premium for all grades silvery to 18 pct.

† Intermediate low phos.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	28.00	31.50	29.00	32.75	33.25	34.50	51.25	41.50	48.25	—	22.25	—	22.50
Billets, forging	—	37.75	38.75	39.50	42.50	42.00	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	49.50	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	31.75 48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	44.25	69.25	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	47.00	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7* Wallingford, Conn., *U3* (plus further conversion extras), *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6* Gary, *U1,* (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5;* Reading, Pa., *C2:* Bridgeport, Conn., *N8.*

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3,* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Ambridge, Pa., *B7;* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Reading, Pa, *C2.*

(Effective July 13, 1959)

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...yet prices start at only $32.25

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Pittsburgh Plug and Products Corporation

P. O. Box 304 Evans City, Pa.

FERROALLOY PRICES

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C....	41.00	0.50% C....	38.00
0.05% C....	39.00	1.00% C....	37.75
0.10% C....	38.50	1.50% C....	37.50
0.20% C....	38.25	2.00% C....	37.25

4.00-4.50% C, 60-70% Cr, 1-2% Si.. 37.25
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 28.25
0.025% C (Simplex) 39.75
8% max C, 50-55% Cr, 6% max Si. 25.75
4½% max C, 50-55% Cr, 2% max Si 26.50

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

Chromium Metal

Per lb chromium, contained, packed, delivered, ton lots, 97.25% min. Cr, 1% max. Fe.

0.10% max. C	$1.29
9 to 11% C, 88-91% Cr, 0.75% Fe...	1.38

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	$1.15
Ton lots	1.17
Less ton lots	1.19

Low Carbon Ferrochrome Silicon

(Cr 39-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in. x down, packed.

Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads, bulk	28.25	14.60
Ton lots	33.50	16.05
Less ton lots	35.10	17.70

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads, bulk	24.00
Ton lots	27.95
Less ton lots	29.45

Calcium-Manganese—Silicon

Cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads, bulk	23.00
Ton lots	26.15
Less ton lots	27.15

5MZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	21.15
Less ton lots	22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	18.45
Ton lots	19.95
Less ton lots	21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload bulk	19.20
Ton lots no carload packed	21.15
Less ton lots	22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn. Carload lots, bulk.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	12.25
Johnstown, Pa.	12.25
Neville Island, Pa.	12.25
Sheridan, Pa.	12.25
Philo, Ohio	12.25
S. Duquesne	12.25

Add or substract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	14.80
Ton lots packed in bags	17.20

Spiegeleisen

Per gross ton, lump, f.o.b. Palmerton, Pa., and Neville Island, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$100.50
19 to 21%	3% max.	102.50
21 to 23%	3% max.	105.00

Manganese Metal

2 in. x down, cents per pound of metal delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	34.00
Ton lots	36.00
250 to 1999 lb	38.00
Premium for Hydrogen - removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 25.50

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% (Bulk) P, 90% Mn	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	33.60	36.40	37.60
0.30% max. C	32.10	34.90	36.10
0.50% max. C	31.60	34.40	35.60
0.75% max. C, 80.85% Mn, 5.0-7.0% Si ...	28.60	31.40	32.60

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

Carloads bulk	12.80
Ton lots, packed	14.45
Carloads, bulk, delivered, per lb of briquet	15.10
Briquets, packed pallets, 2000 lb up to carloads	17.50

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots,	Carloads,
98.25% Si, 0.50% Fe..	22.45	21.25
98% Si, 1.0% Fe	21.95	20.65

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk	8.00
Ton lots, packed	10.80

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si....	14.60	75% Si....	16.90
65% Si....	15.75	85% Si....	18.60
	90% Si....	20.00	

Ferrovanadium

50-55% V delivered, per pound, contained V, in any quantity.

Openhearth	3.20
Crucible	3.30
High speed steel	3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots .....|	$2.05	$2.95	$3.75
100 to 1999 lb..	2.40	3.30	4.55

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads, bulk	9.85¢
Ton lots	11.20¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.50

Ferrocolumbium, 58-62% Cb, 2 in. x D, delivered per pound

Ton lots	$3.45
Less ton lots.....	3.50

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta $3.40

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.76

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $5.00 unitage, per gross ton $120.00
10 tons to less carload $131.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $240.00

Ferrotungsten, ¼ x down packed, per pounds contained W, ton lots delivered ..... $2.15 (nominal)

Molybdic oxide, briquets per lb contained Mo, f.o.b. Langeloth, Pa. $1.49
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.38

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.

Carload, bulk lump	18.50¢
Ton lots, packed lump	20.50¢
Less ton lots	21.00¢

Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5 .... $1.38

Zirconium silicon, per lb of alloy 35-40% del'd, carloads, bulk.. 26.25¢
12-15%, del'd lump, bulk-carloads ..... 9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload $5.50

Bortram, f.o.b. Niagara Falls.

Ton lots per pound	45¢
Less ton lots, per pound	50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ..... 14.00¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots... $1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up

10 to 14% B	.85
14 to 19%	1.20
19% min. B	1.50

Grainal, f.o.b. Cambridge, O., freight, allowed, 100 lb and over

No. 1	$1.05
No. 79	50¢

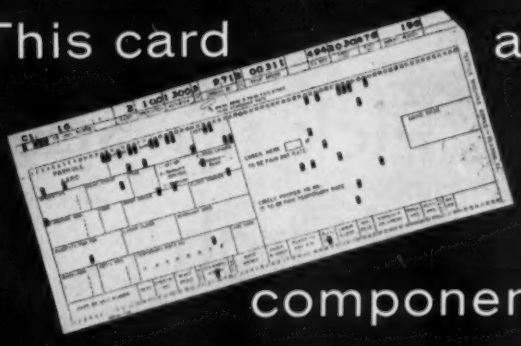
Manganese-Boron, 75.00% Mn, 17.50% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots (packed)	$1.46
Less ton lots (packed)	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots 2.15

(Effective July 13, 1959)

This card assures you **on-time delivery** of sub-contract components and assemblies



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MOTOR GENERATOR SETS

(3)—3500-KW Allis-Chalmers 5-unit sets consist of (2) 1750-KW Gen., 350/700-VDC, (1) 5000-HP syn. motor, 13800/6900/4160-V, 3 hp., 60 cy., (2) exciter generators.

(1)—S. & S. 5-unit set consists of—(1) 2500-HP syn. motor, 11000/4160-V., 3 ph., 60 cy., (1) 1060-KW Gen. 600-VDC, (2) 760-KW Gen. 600-VDC, (1) exciter gen. (Will split this set to fit your requirements).

(1)—200-KW Set consisting of (2) 1000-KW gen. 600-BDC, (1) 2500-HP syn. motor, 11000/-4160-V., 3 ph., 60 cy.

(1)—1875-KW Whse. 2-unit set—(1) 250-VDC gen., (1) 2700-HP syn. motor, 13800/6900/-4160-V., 3 ph., 60 cy.

(1)—1250-KW Gen., Elec. 2-unit set—(1) 132/265-VDC gen., (1) 1750-HP syn. motor, 4160-V., 3 ph., 60 cy.

(1)—850-KW Gen. Elec. 2-unit set—(1) 250/300-VDC gen., (1) 1250-HP syn. motor, 13800/-6900/4160-V., 3 ph., 60 cy.

MOTORS

(1)—2200 H.P. Westinghouse motor, 600 VDC., 92/132 R.P.M.

(2)—600 HP, Allis Chalmers Motors, 600 VDC, 300/600 R.P.M.

T. B. MAC CABE COMPANY
4302 Clarissa St., Philadelphia 40, Penna.
Cable Address "Macsteel" Philadelphia, Pa.
Phone Davenport 4-8300

Sales Pick up Speed At Pittsburgh

Used machinery market there has better tone, but business still isn't back to normal.

However, with both inquiries and orders improved, dealers are waiting to meet the coming needs of customers.

▪ Pittsburgh machinery dealers say the slump is over but the boom hasn't yet started. There's been a definite improvement but business has not reached normal levels on any sustained basis.

Labor uncertainty in steel has caused some hesitation among buyers, even when plants are not directly tied to basic production. According to one dealer, the buildup in inventories of steel has tied up cash and postponed spending for equipment.

Better Market Tone—But even with this problem, dealers feel there is a better tone to business. A supplier of steel mill equipment finds things "surprisingly satisfactory." After a long lean period, he reports a comfortable volume of activity.

A dealer in general machinery says there are more inquiries and more sales activity. Both fabricating lines and machine tools are attracting interest. Smaller plants have begun spending. Supplies of equipment are called generally good with machine tools more plentiful than fabricating equipment.

Ready for the Rush — Much the same story is reported for materials handling equipment. Order volume is up. New customers are coming into the market. Emphasis so far is on the lighter type of handling equipment.

In the overall picture, used machinery is in a good position to capitalize on the rush needs of the recovery. An example of how this is happening is reported by Frank B. Foster, Inc., Pittsburgh suppliers of steel mill equipment.

Mill for Canada — The Foster company recently shipped a blooming and slabbing mill to Interprovincial Steel Corp., Ltd., Regina, Saskatchewan. The mill will be used in a new steel plant. It will help roll plate that will go into linepipe. With pipeline activity in western Canada moving into high gear, the time savings offered by used equipment were critically important.

Changeover—The mill in question was built by United Engineering & Foundry Co. in 1949 for an English steel plant. In terms of steel mill equipment it is still relatively new. However, the original owner needed a replacement unit in order to meet changing product requirements.

On the return trip, the shipment was loaded at Swansea, Wales. The 250,000 lb mill housings were the heaviest single lifts ever handled at the port. The whole shipment weighed over 2 million lb.

The mill assembly was shipped through the St. Lawrence Seaway and unloaded at Duluth. The unloading was made possible by two new 90 ton cranes, installed at Duluth to handle Seaway shipping.

CONSIDER GOOD USED EQUIPMENT FIRST

BENDING ROLLS
10' x 10 Ga. Bertsch No. 6 Initial Type
10' x 3/16" WEBB INITIAL TYPE—Late
12' x 3/8" BERTSCH INITIAL TYPE—Late
32' x 3/8" BALDWIN PYRAMID TYPE—Late

BRAKE—BOX & PAN
8' x 1/4" Dreis & Krump, 12" Finger Extension

BRAKES—PRESS TYPE
90 ton Niagara, Model 90-8-10
8' x 3/16" Warco
10' x 10 Ga. Clearing

CRANES—OVERHEAD ELECTRIC TRAVELING

3 ton P&H	40' Span 220 Volt D.C.
8 ton P&H	55' Span 230/3/60
10 ton P&H	39' Span 230 Volt D.C.
10 ton Milwaukee	57' Span 230 Volt D.C.
10 ton Shaw	48' Span 230 Volt D.C.
10 ton Whiting	75' Span 220/3/60 A.C.
10 ton Shaw	120' Span 230 Volt D.C.
30 ton Shaw	70' Span 230 Volt D.C.
120 ton Niles	67' Span 230 Volt D.C.
120 ton Shepard Niles	77' Span 220/3/60 A.C.

DRAW BENCHES
7,000 lb. Draw Bench, 51 ft. Draw
10,000 lb. Draw Bench, 50 ft. Draw
35,000 lb. Draw Bench, 41 ft. Draw

FLANGING MACHINE
Blue Valley Flanging Machine, Capacity 1/8"

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1" to 5" Acme, Ajax, National

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#250C Manville Single Stroke Solid Die
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72 Leveler 17 Rolls 2⅝" Backed Up

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Pullmax Model 2, Capacity 11/32"

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300 ton Southwark Platen 28" x 28", Stroke 25"
500 ton Watson Stillman Piercing Press, 48" x 72"
1000 ton Southwark Bed 44" x 54", Stroke 20"
4500 ton B-L-H Bed 68 x 68", Stroke 40"

PRESS—KNUCKLE JOINT
800 ton Cleveland Model 8-K, 6" Stroke

PUNCH & SHEAR COMBINATIONS
#2½ Buffalo Ironworker
Style EF Cleveland, 42" Throat, Plain Jaw
#8 Kling, 36" Throat Capacity 1⅝" x 1

RIVETERS
130 ton Southwark Hydr., 125" Throat
275 ton R. D. Wood Hydr., 18'6" Throat

ROLLING MILLS
3½" x 7" Six Roll Cluster Mill
10" x 14" Single Stand Two High
13" x 16" Single Stand Two High
16" x 24" Two Stand Two High
20" x 36" Single Stand Two High
26" x 60" Single Stand Two High
12" x 32" Birdsboro 3-Hi Bar Mill
22" x 40" Lewis 3-Hi Sheet Mill
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18 Stand Custom Built 2½ Shaft, will take 36 wide

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No. 23A Quickwork Whiting 3/16" Capacity

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8' x ½" Bertsch

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36" Wean Slitting Line, Arbor 5" Dia
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1½" Standard Tube Reducer
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MACHINE TOOLS

1—24" x 23 Ft. C.C. MONARCH ENGINE LATHE, Serial 10474, 27½" swing, 4-jaw chuck, two carriages, taper attachments, steadyrests, 30 HP., AC

3—NILES TIMESAVER BORING LATHES, Serial 22299, 22300, 22301. 33' x 12" diameter maximum depth bore, 20¼" maximum work diameter, 6" maximum bar diameter, spotting carriage, bar supports and tailstock. 25 HP., AC

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1—Gisholt No. 4 Super Finishing Attachment Model 73 with crankpin follower arm. New 1956

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1—7½ Ton SHAW O.E.T. CRANE, cab operated, Serial 2416, 3½ ton auxiliary hoist, lift 34'-1", span 40'-8¾", 4 motors, 230 volt DC

1—5 ton SHAW O.E.T. CRANE, cab operated, Serial 1436, lift 11'-2", span 31'-8½", 3 motors, 230 volt DC

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14,000 T. Mesta Steam Hyd. Forging Press, 1942.
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3,000 T. United Eng. Steam Hyd. Forg. Press, '43.
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LANDIS NILES 14' x 28'cc Cyl. Grinder, new '52.
3250 TON MESTA FORG. PRESS—New '55, like new.
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10x18" Norton Type C, m.d., latest
10x36" Cincinnati Hydraulic, m.d.
10x36" Norton Type C, m.d.
10x36" Landis Type CH Plain, m.d.
10x48" Cincinnati Model ER Plain Hydraulic, m.d.
12x36" Landis Plain Self-Contained, m.d.
14x36" Landis Type C, m.d., 1945
16x96" Cincinnati Plain, m.d.
16x40"x120" Cincinnati Plain Heavy Duty, 1953
16x120" Landis Type B, Plain H.D. Hydraulic, m.d., late
18x36" Landis Type C, m.d.
18x72" Norton Type C, mechanical, m.d.
20x72" Landis Type DC, m.d., 1944
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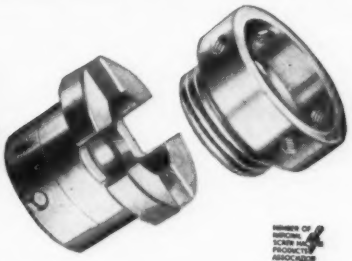

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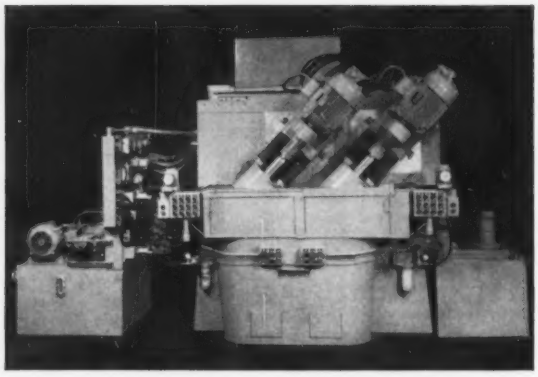
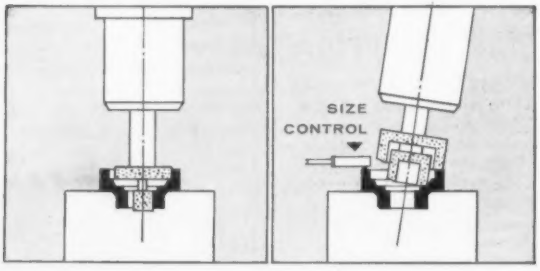
Vertical grinding reduces setups

SPRINGFIELD



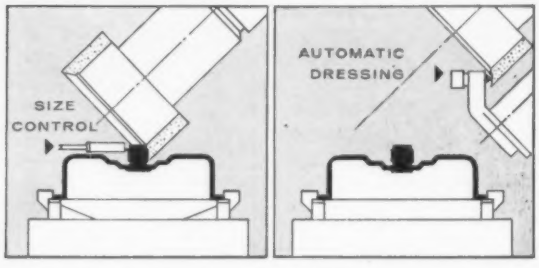
One head grinds while the other retracts for dressing, unloading and loading.

The double spindle Springfield vertical grinder in the photo is typical of vertical grinders automotive production men are using to 1) reduce setups, 2) improve grinding productivity, and 3) save floor space.



Transmission sun gear, 4 surfaces ground in 2 operations.

Two double spindle vertical grinders grind 330 gears per hour. Size control and wheel dressing are accomplished automatically. Typical machine cycle shown below.



Transmission housing hub, 1.–form grinding with automatic size control; 2.–spindle retracted for automatic dressing while operator unloads machine.

When part requirements change, only dresser, fixtures and sizing devices change—the machine itself has a long production life because heads can be repositioned easily.

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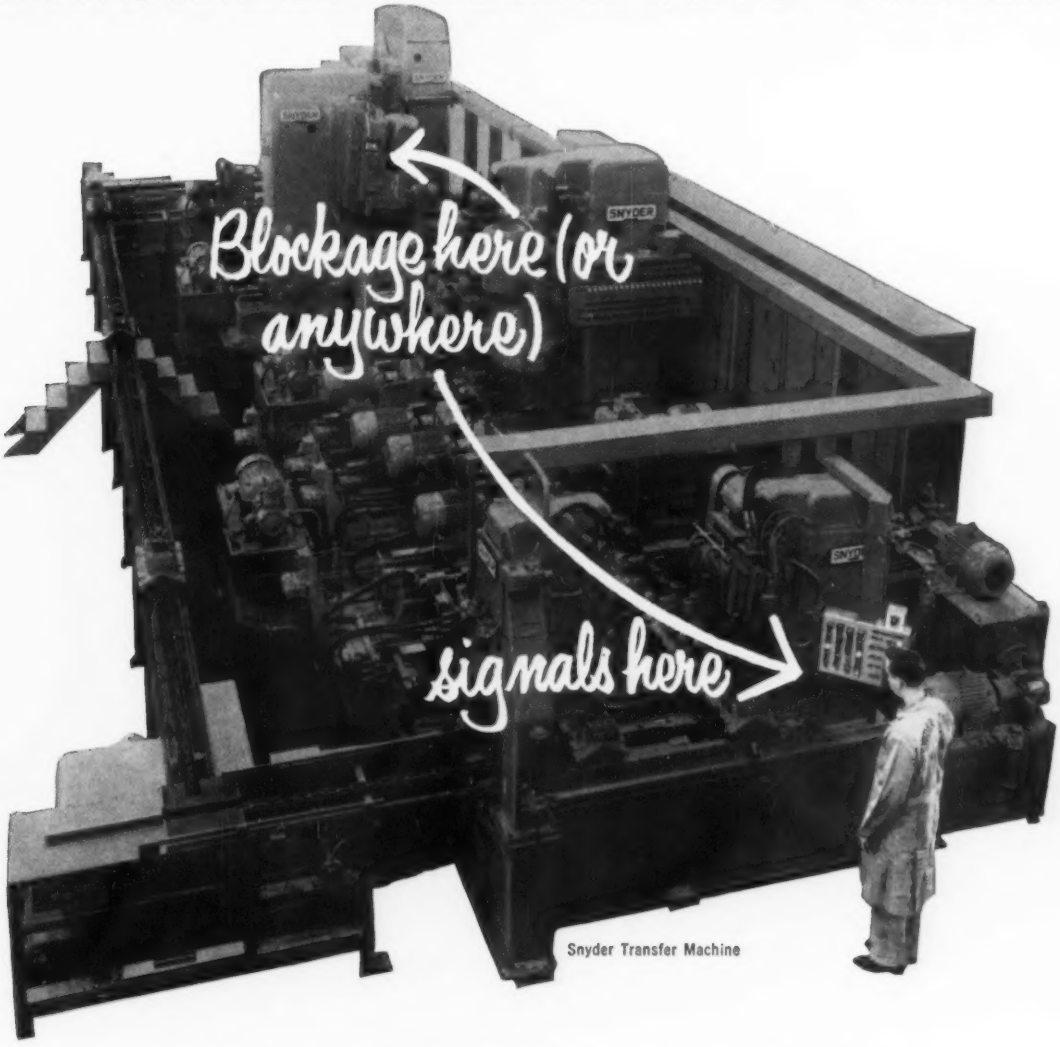
TRABON®

CENTRALIZED LUBRICATING SYSTEMS



Snyder Transfer Machine

First with Central Warning in a Centralized System!

Yes, Trabon's positive piston operation gives you a truly centralized oil or grease system — making sure that every bearing gets its accurate measured amount — **and giving you central warning** at the pump or control panel when a bearing is blocked **anywhere** in the system.

For example, on this 60 foot transfer machine a red fault light located at the operator's station gives immediate warning in case of blockage 10 feet or 60 feet away. There is no need to make tedious, time-wasting inspection trips at frequent intervals to make sure all bearings are getting a positive shot of lubricant. Trabon does the job for you! And—should blockage occur—finding the trouble spot is easy! For Trabon's inexpensive Reset Indicators enable you to pinpoint the blocked condition in a matter of seconds.

Why not specify Trabon for your machinery investment. It's the modern, better way to lubricate positively and safely! (And versatile Trabon systems can be operated automatically by air, hydraulic, electric or mechanical actuation.)

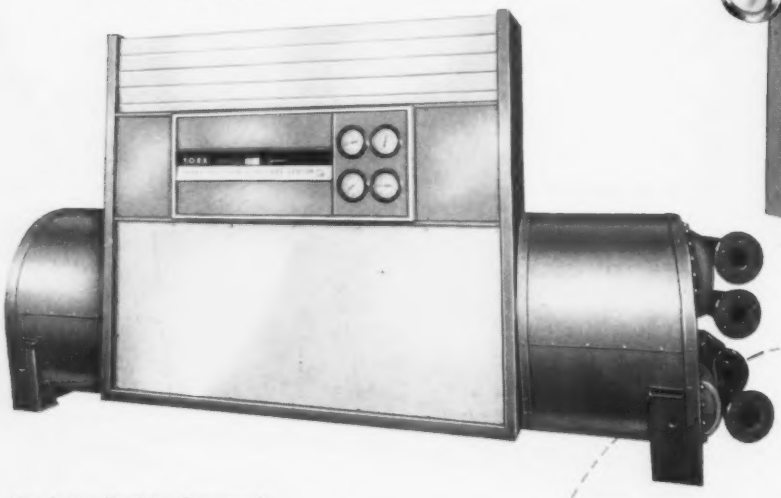
Trabon®

"Centralized" OIL AND GREASE SYSTEMS "Meterflo" CIRCULATING OIL SYSTEMS

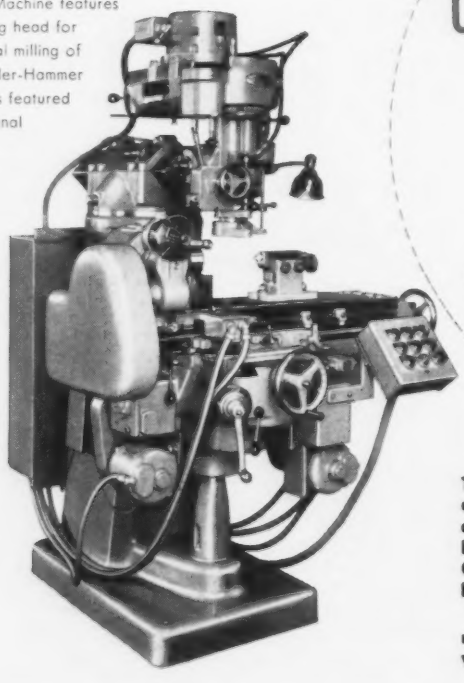
Trabon Engineering Corporation 28815 Aurora Road • Solon, Ohio

The Reid Brothers Company, Inc. installs Cutler-Hammer Motor Control on their Reid-O-Matic Model 824 Surface Grinding Machine. Fully automatic grinding controls cut set-up time, improve production efficiency.

The York Corporation, subsidiary of Borg-Warner Corp. provides Cutler-Hammer Control on the Turbopak Centrifugal Water Chilling System. The completely integrated Turbopak system simplifies installation, maintenance, and operation.



The Index Machine Company's Vertical Milling Machine features a geared dividing head for automatic vertical milling of spiral forms. Cutler-Hammer Motor Control is featured as standard original equipment.



Choice of the leaders

CUTLER-HAMMER CONTROL C-H

...the mark of better machines

The proper performance of any machine requires dependable, trouble-free service from the motor control which directs and protects it. This is why leading machinery builders use Cutler-Hammer Control. It installs easier . . . works better . . . and lasts longer.

For prompt attention to your control requirements write Dept. N246, Cutler-Hammer Inc., Milwaukee 1, Wisconsin

CUTLER-HAMMER

Cutler-Hammer Inc., Milwaukee, Wis. • *Division:* **Airborne Instruments Laboratory.** • *Subsidiary:* **Cutler-Hammer International, C. A.**

Associates: Canadian Cutler-Hammer, Ltd.; Cutler-Hammer Mexicana, S. A.; Intercontinental Electronics Corporation.